

The Commercial Car Journal

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AUTOMOBILE EXPORTS EXCEED \$100,000,000 AND REPRESENT ONE-TENTH OF GROSS VALUE OF AMERICAN PRODUCTION

Figures just issued by the Department of Commerce show that 80,658 motor vehicles, valued at \$100,258,220, were shipped from the United States during the twelve months ended June 30, 1916. This represents one-fifteenth of all the motor vehicles produced in this country in the last fiscal year and one-tenth of their gross value, according to estimates of the National Automobile Chamber of Commerce.

There were shipped to foreign countries (not including American possessions) 21,295 commercial cars valued at \$56,805,558 and 56,234 passenger cars valued at \$40,660,263. England, France and Russia took nearly all of the trucks (19,028) and nearly one-quarter of the passenger cars (13,848) or, in all, two-thirds of the total value of the exports. Great Britain and her colonies bought 43 per cent. and France and her colonies about 20 per cent. The Philippine Islands and the American possessions (Alaska, Hawaii and Porto Rico) received 4488 motor vehicles, worth \$3,740,145.

Products of American factories went to 78 different countries including Roumania, Switzerland, Serbia, the Azores, Madagascar, French Africa, Tasmania, Korea, Paraguay, Guianas, Nicaragua, Haiti and the Danish West Indies.

Nearly 90 per cent. of all the automobile exports were taken by twelve countries as follows: England, France, Russia, Canada, Australia and Tasmania, Cuba, New Zealand, Argentina, British South Africa, British India, Philippines and Dutch East Indies.

SHORTAGE OF FREIGHT CARS CONTINUES

Shortage of freight cars continues in all lines of trade, with railroad terminals congested and many factories suffering for the need of freight cars to move their product.

The commercial vehicle department of the National Automobile Chamber of Commerce, reports that it was endeavoring to supply complete data to the law makers in various states in connection with proposed legislation governing the use of motor trucks on the highways, which will permit the special commissions and others to make recommendations for reasonable legislation which will not hamper the growth of the motor truck industry that is rapidly decreasing the cost of moving products not alone on city streets but to and from railroad terminals.

Table of Contents

	Page
Advertisers' Index.....	173
Accessories and Appliances.....	24
An Accounting System for Dealers.....	17
Bourne Magnetic Truck.....	38A
Capacities of Commercial Car Cooling Systems.....	33
Cartoon of Sales Managers.....	16
Design and Construction.....	29
Editorials.....	13
Factory News.....	4
How New York Compiles Traffic Statistics—By George W. Grupp.....	22
How to Dress Up Your Show Window—By George W. Grupp.....	54
M. T. A. of Philadelphia Activities.....	11
Manly Truck.....	39A
Many Uses Found for Tractors on the Farm—By Warren Eugene Crane.....	35A
Motor Truck Tires and Rims—By C. T. Schaefer.....	29
New Commercial Cars.....	37
New Truck Agencies.....	4
Personal Items.....	4
Republic Fifteen Hundred Pound Truck.....	37
Sewers Cleaned by Motor Power—By C. P. Shattuck.....	56
Tractor Department.....	35A
Trailer Department.....	34A
Truck Driver Real Factor in Successful Installation—By C. W. Shafer.....	52
Trucks Make Good in Newspaper Service—By C. P. Shattuck.....	50
Union Two and a Half Ton Truck.....	41
Wilson Chainless-Drive Trucks.....	44

CLEVELAND HAS \$2 WHEEL TAX AND ADDITIONAL FEE FOR COMMERCIAL CARS

City Council Committee on Streets, Cleveland, O., recently approved a wheel tax of \$2 a year for all vehicles using the city's streets. An amendment to the traffic rules prohibiting the use of iron tires on motor trucks and requiring rubber tires to be at least 1/4 in. thick at the wheel flange was approved.

In addition to the wheel tax of \$2 a year per vehicle of any kind, another tax of \$1 per ton will be levied on all commercial cars whose capacity is in excess of 1 ton. While the new tax will undoubtedly be of value to Cleveland truck owners because it will raise additional money for the Cleveland streets, its principle is wrong. Horse wagons are not to be taxed on their capacity, neither are passenger cars. Why then should trucks be?

Make your product pay—advertise in the CCJ

A. A. A. CODIFYING TRAFFIC RULES

President H. M. Rowe, of the American Automobile Association, states that safety of traffic is decreased rather than increased by too much law; that much remains to be done before avoidable accidents may be reduced to a minimum by a few simple rules that can be universally observed and easily understood. The elimination of all unnecessary requirements of the law would, in many cases, do away with three-quarters of the present law. He states that the principal difficulty is the unwillingness of the public to accept and obey such rules and regulations; that between 90 and 95 per cent. of all accidents that occur result from the neglect of the individual pedestrian and less than 5 per cent. are caused by the direct fault of the motorist or the reckless use of the car. The A. A. A. has, through its legislative board, set about codifying such a practical set of traffic rules that may be easily understood and observed.

BROWN-LIPE-CHAPIN COMPANY TAKEN OVER BY UNITED MOTORS CORPORATION

Brown-Lipe-Chapin Co., Syracuse, N. Y., manufacturer of automobile differentials and gears, has become associated with the United Motors Corp.

The Brown-Lipe-Chapin Co., as is the case with each unit of the parent corporation, will retain its name, its management and its general policy. H. W. Chapin will continue as general manager and those who have been with him in the successful operation of the business will remain.

BOSCH MAGNETO COMPANY BUILDING IN CHICAGO

The Bosch Magneto Co. has purchased a plot of ground in Chicago where it will erect a new and enlarged branch building. The present location at Michigan Avenue and 24th Street, having an area of 6000 sq. ft., will be vacated about the 1st of December for the new branch building located on Michigan Avenue and 37th Place. Nearly 15,000 sq. ft. of floor space will be provided for, and it is about 2 1/2 times as large as the buildings now available. A new installation department will be opened, as the demand for installing, lighting and starting and ignition systems is growing considerably, and requires special accommodations. In this respect the branch will be able to accommodate five times as many cars as heretofore.

One thousand pound truck units and parts will be featured in our December issue

Factory News

Burtless Motor Sales Co., Grand Rapids, Mich., truck dealer, will erect garage and salesroom at 16-18 Commercial Avenue, S. W.

Utica, N. Y.—A. Sacco & Sons, local distributors for the Chase commercial car, are erecting a large fireproof garage at 510-12 Elizabeth Street.

Moreland Motor Truck Co., Los Angeles, Cal., maker of the Moreland commercial car, will establish an assembling plant in Portland, Ore., in the near future.

Brockton, Mass.—Allen Garage, 600 N. Main Street, purchased by Curtis, Curtis & Lyons. They have the agency for Signal and Henderson trucks and Rayfield carburetors.

Parker Rust Proof Co. of America, 864 Woodward Ave., Detroit, Mich., is erecting a large plant on Conant Road in Hamtramck, fronting the Belt Line R. R. It will manufacture a rust proof liquid largely used on motor cars.

Herbert C. Barkley, manufacturer of bodies for delivery trucks, is erecting a 3-story steel and brick building at 500-10 Front Avenue, N. W., Grand Rapids, Mich., to provide facilities for doubling the output of his plant.

Line Drive Tractor Co., of Pierre, S. D., has established a plant at South Milwaukee, Wis., in charge of I. W. Davis. The application to do business in Milwaukee states that the capital stock is \$750,000, of which \$15,000 is invested there.

Signal Motor Truck Co. of New England, Boston, Mass., has been incorporated with \$100,000 capital. Directors of the concern are: Charles F. C. Henderson, 16 Russell Street, Cambridge, Mass., president and treasurer; George W. Tibbetts and C. C. Barton, Jr.

Packard Motor Car Co. is erecting sales and service building at Shrewbury & Aitchison Streets, Worcester, Mass., to house garage 394 x 70 ft. and showroom with 116 ft. frontage for the display of Packard cars and trucks. The building will be ready for occupancy by February 1st and will cost approximately \$100,000.

Colonial Motors Co., Detroit, Mich., has been incorporated with \$200,000 capital to build an eight-cylinder engine at the factory recently completed and occupied on Addison Avenue near Junction, which has a capacity of 10,000 engines per year. The officers are: Claude S. Briggs, president and manager, and Emil D. Moessner, secretary and treasurer. Offices have been opened in the Kresge Bldg.

Packard Motor Car Co. now has six extensions, additions and new buildings under construction, which will add four acres to the floor space. The larger of the additions now under way are two-story wings to the stock building, 103 x 200 ft. each, and an addition to the main power house, 65 x 140 ft., which will double the space of the power plant. Other units under construction are a traffic garage, fourth story additions to two technical service buildings, lumber sheds and a finished truck storage building. The total floor space of the plant will be 58.6 acres with the completion of the improvements listed. There are now 66 buildings on the factory site, which covers 50.6 acres of land.

Metropolitan Section of the S. A. E. will hold a meeting on November 16th, at 8 p. m., at the Automobile Club of America, 54th Street, New York City, at which Mr. C. F. Kettering will speak on, "Some Present and Future Scientific Problems of the Automobile."

New Truck Agencies

Federal Motor Truck Co., Forest Park Boulevard at Grand Avenue, St. Louis, Mo. Allen Baker, president, has taken the agency for the Troy motor truck trailers.

Independent Garage, recently established at 505 Villa Street, Racine, Wis., with Kemmis & Verfurth as proprietors, has secured the agency for the Acme motor truck, made by the Cadillac Motor Truck Co., Cadillac, Mich.

M. F. Collins Co., Boston, Mass., has taken the agency for the Wilson truck and has opened salesrooms at 570 Commonwealth Avenue with a service station at 690 Beacon Street. F. A. Collins has charge of the agency.

Stedfeld Motor Sales Co., 338 North Capitol Avenue, Indianapolis, Ind., has been organized to handle the distribution of the Stewart trucks for central Indiana. H. L. Stedfeld will have charge of the management of the concern.

West Side Buick Co., 2713-15 Grand Avenue, Milwaukee, Wis., has the agency for the G. M. C. truck. The officers of this new company are L. M. Jeger, president; E. M. Jordan, vice-president; W. H. Schurman, treasurer, and Alfred Klingelhoefer, secretary.

Graceland Garage, 1337-45 Irving Park Blvd., Chicago, Ill., which together with one hundred automobiles was destroyed by fire, the loss amounting to about \$150,000, almost all of which was covered by insurance, will be rebuilt. Until the old garage is rebuilt it will occupy the large garage at 7475-78 Rogers Avenue. The company has the agency for the Atterbury commercial cars.

Packard Motor Car Co. of New York has opened a large salesroom at 421 W. 56th St., which will be the headquarters of sales of used trucks and which will be in charge of H. M. Neville and W. E. Bleezard. Besides the sale of used trucks the new salesroom will also unburden the new truck department of certain duties in connection with its sales, such as inspection of trucks when they arrive at the factory, and demonstrations.

Union Truck Mfg. Co., New York City, has appointed the following agencies for Union attachments: Case, Breidenstein Co., Hillside & Jamaica Avenues, Jamaica, N. Y.; Seaman Motor Car Co., Glencove, N. Y.; South Coventry Garage, South Coventry, Conn.; Windham Garage, Willimantic, Conn.; Acme Garage, 295 South Orange Avenue, Newark, N. J.; Clarence E. Wright, 115 Waterman Avenue, East Providence, R. I.; E. Fowler & Son, Carmel, N. Y.; A. F. Hoffman, 55 Maple Avenue, Mt. Kisco, N. Y.; H. J. Stout & Son, 8 West State Street, Trenton, N. J.; Nassau Garage, Mineola, N. Y.; New Rochelle Hygeia Ice Co., 2-8 First Street, New Rochelle, N. Y.; H. Lund Smith, 195 Paterson Street, Paterson, N. J.; Guillermo Petriccione, Marina 64, Havana, Cuba; Oscar S. Brandt, Philadelphia, Pa.; Goodwin Motor Sales Co., Rockville Center, L. I.; S. L. Benedict, 67-73 North Main Street, South Norwalk, Conn.; Central Auto Garage, Hackensack, N. J.; Cornwell & Morrell, Riverhead, N. Y.; William Taubman, 17 Barbour Street, Hartford, Conn.; Louis Segall, Waterbury, Conn.; G. W. Henschel, Bayside, N. Y.; James L. White, Southampton, L. I.; F. V. Lehman, Babylon, N. Y.; Union Motor Car Co., Bridgeport, Conn.; Harry Baisuk, 44-46 Buell Street, Batavia, N. Y.; E. S. Kimball, New Haven, Conn.

Personal Items

John H. McCusker, of Boston, now has charge of the truck business of the Packard Motor Co., Portland, Me.

J. B. Corby has been appointed manager of the St. Louis branch of the Chicago Pneumatic Tool Co., manufacturer of the Little Giant truck.

Matthew F. Morse, for five years secretary of the Automobile Club of St. Louis, resigned to take a position in the St. Louis branch of the White Automobile Co.

A. A. Giesel, identified with the motor truck industry for many years, has returned to the Federal Motor Truck Co., after an absence of three years, as New England sales manager.

J. E. Ellsworth is at the head of the engineering and purchasing departments of the Mills-Ellsworth Co., Keokuk, Ia., manufacturer of the Ellsworth light delivery car, and J. A. Bell is directing the sales and advertising.

G. D. Wilson, for the past four years production manager of the C. R. Wilson Body Co., Detroit, Mich., has become production and sales manager with charge of the inspection department.

A. E. Winckler, formerly chief engineer of the automobile department, J. I. Case T. M. Co., Racine, Wis., has returned for a six-month study trip to Europe, and is now chief engineer of the Pittsburgh Model Engine Co., Pittsburgh, Pa.

J. N. Cross, who has been associated with the Beach-Cross Co., of Detroit, builder of commercial car bodies, has severed his connection with that company to take up duties in the Olsen wheel department of the Swedish Crucible Steel Co., of Detroit.

George D. Edwards, manager of the Detroit branch of the Kelly-Springfield Tire Co., died recently at the age of 58. He had been connected with the Kelly-Springfield Co. for 21 years. His son, Arthur L. Edwards, who has been connected with the company for 14 years, becomes manager.

John L. Wierengo, formerly general sales and advertising manager of the Continental Motors Co., has been created general manager of the Detroit Truck Co. He has had a wide experience in handling-sales, production and advertising of automobiles. An addition to the plant at 48-52 8th Street is being planned, and the distribution force of the company is being reorganized.

Bay State Street Railway Co., operating lines of trolleys through Manchester, N. H., and down eastern Massachusetts to Providence, R. I., in order to lessen accidents and make truck drivers more careful, has ordered its motormen to take the number of every motor vehicle which does not stop when a trolley car is taking on or letting off passengers. The circumstance will be reported to the company, and the officials will determine whether to summon the drivers before the courts or complain to the Highway Commissioner, requesting that licenses be suspended.

CORRECTION: In the October issue of the COMMERCIAL CAR JOURNAL we published a description of the Maccar Truck, made by the Maccar Truck Co., Scranton, Pa. In this description the price of the Model U should be \$4150, and the rear tires should be 40 x 6 in. dual.

For its readers—information; for its advertisers—results. That's the purpose of the CCJ

BUDD WHEEL CORPORATION FORMED WITH \$2,000,000 CAPITAL STOCK

A new industry capitalized at \$2,000,000, known as the Budd Wheel Corp., has been formed to manufacture steel and wire wheels. A new plant covering more than 6 acres of floor space is being erected at 25th & Hunting Park Ave., Philadelphia, adjoining the plant of the Edward G. Budd Mfg. Co. This plant, when completed, will contain more than \$500,000 worth of machinery. The company is an expansion of the Edw. G. Budd Mfg. Co., which manufactures complete pressed steel bodies for automobiles and commercial cars. At first the corporation expects to turn out 1000 wheels per day, and ample space for enlargement of the plant has been provided for. The capital stock is made up of



W. H. ALFORD

New vice president and controller of the Nash Motors Company, Kenosha, Wis., builders of the Jeffery truck.



R. J. FIRESTONE

For the past ten years sales manager of the Firestone Tire & Rubber Company, has been recently elected vice president.



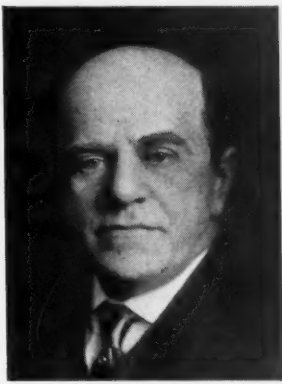
A. G. PARTRIDGE

Formerly assistant sales manager of the Firestone Tire & Rubber Company; now general sales manager.



L. M. BRADLEY

Newly appointed general manager of the Motor and Accessory Manufacturing Association of New York City.



LOUIS HENRY PERLMAN

President of the Perlman Rim Company, Inc., of Jackson, Mich., whose factory is producing five thousand sets of rims per day.



J. MURRAY PAGE

who has just been appointed manager of the Chicago Locomobile branch at 2000 Michigan Avenue.

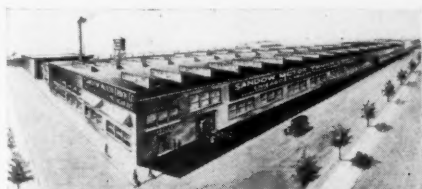
GOVERNOR BUSINESS SHOWS GREAT ACTIVITY

That speed governors are looked upon as necessities by motor truck manufacturers is very strikingly shown by the activity in the new Monarch Governor plant, of Detroit. The development even during the past six months has been unusual. Motor truck manufacturers have always maintained that the greatest foe to truck endurance, low upkeep cost and efficiency is speeding. Drivers seem to believe that because it is a truck it will stand the most severe abuses, the commonest and most destructive of which is speed. Truck users also have come to look upon the speed governor as one of the most important parts.

\$1,000,000, 7 per cent. preferred stock and \$1,000,000 common. It is all in the hands of private interests and is not likely to be placed on the market.

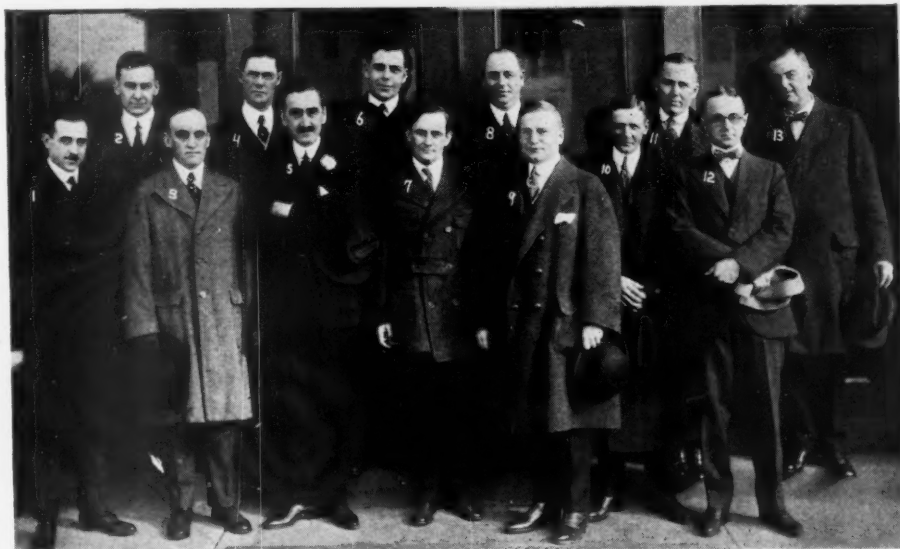
MOTOR TRUCK OWNERS PROTEST AGAINST CHICAGO FENDER ORDINANCE

At a dinner recently given by the Motor Truck Owners' Association in the Hotel Sherman, Chicago, 3000 motor truck owners protested against the amended fender ordinance requirements as mechanically impractical. They believe the ordinance in effect would prove a menace instead of a safeguard. The dinner hosts are members of the Motor Truck Owners' Association.



New Addition to Sandow Truck Plant

New daylight manufacturing plant of the Sandow Motor Truck Company, of Chicago, located at 3300-50 Grand Avenue. This plant, in addition to the original plant at 2916-24 West Lake Street, gives the Sandow Company one of the largest truck plants in the West

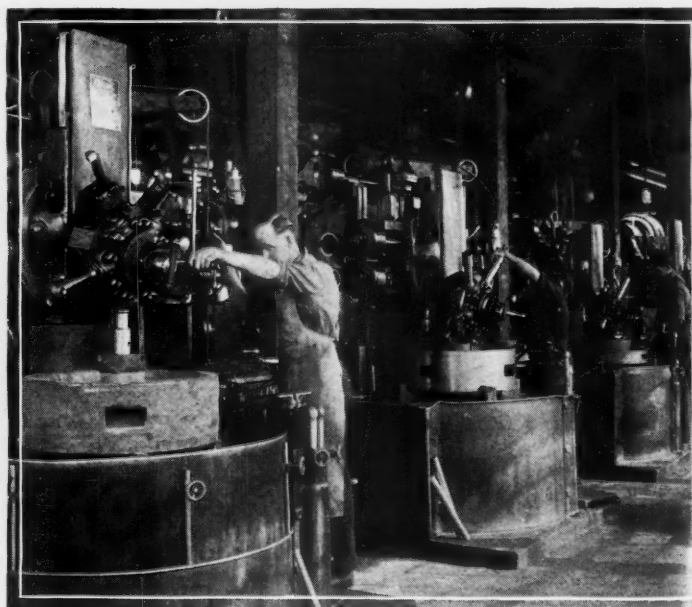
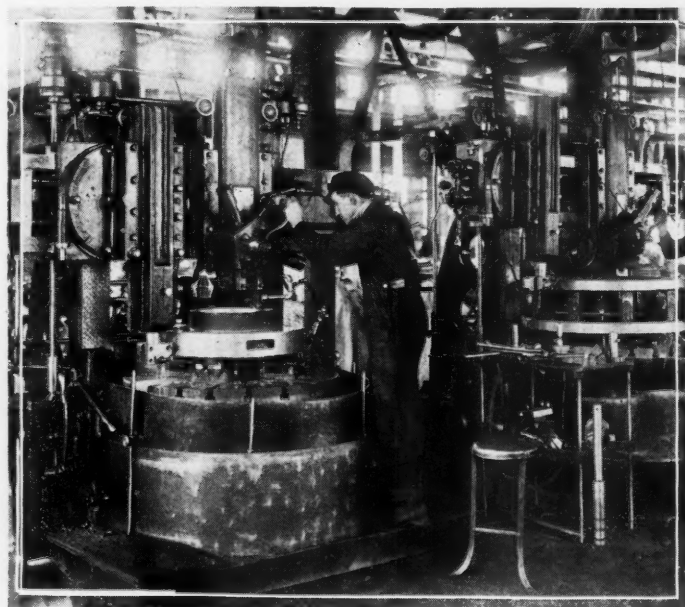
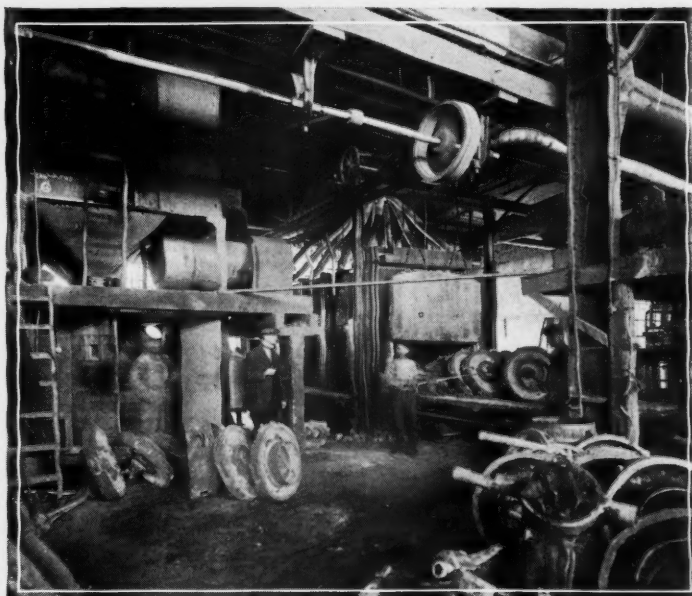
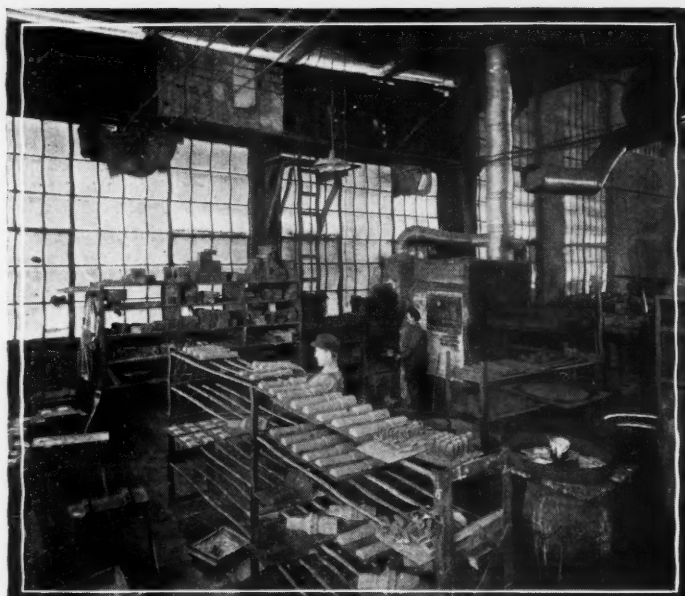


First Selden Sales Conference

The first conference of division sales managers and prospective division managers, under the regime of Sales Director H. T. Boulden, was held at the company's general office in Rochester, N.Y., on November 2nd, 3rd and 4th. This meeting was presided over by Mr. Boulden, who was ably assisted by President Geo. C. Gordon, Vice-President Wm. C. Barry, Jr., and Secretary R. H. Salmons.

The Selden representatives in attendance as shown in the above illustration, are: (1) Geo. S. Holvey, Home Office Sales Department; (2) E. W. Templin; (3) Chas. N. Gillette, Southeastern Representative; (4) Chas. E. Collard, Atlantic Coast Representative; (5) Wm. C. Barry, Jr., General Manager Selden Motor Vehicle Company; (6) Edw. F. Drew, Middle West Representative; (7) Paul B. Donaldson, Northwest Representative; (8) W. E. Dugan, Factory Manager; (9) H. T. Boulden, Sales Director; (10) J. E. Morse, New England Representative; (11) C. L. DuPuy, Southwestern Representative; (12) S. P. Gould, Rochester; (13) D. S. Everett, Pacific Coast Representative.

Why is the CCJ the only truck paper a member of the Audit Bureau of Circulations? Here's food for thought



Views of Buchanan Electric Steel Company's Foundry and Machine Departments

1. A general view of the foundry, which is unusually light, showing the steel furnaces on the right and the overhead crane serving the entire building.
2. Cleaning department, where the wheels are sanded and snagged and rough places ground off.
3. Core department, showing the racks holding the finished cores and the ovens into which the racks slide for baking the cores.
4. Annealing department, where the wheels are subjected to reheating in oil-fed furnaces.
- 5 and 6. Vertical Bullard boring mills in the machine department, where the wheels with their integral brake drums are bored out, turned and finished.

Advertising appropriations bring greatest returns when expended in the CCJ

The Electric Steel Furnace, and Cast-Steel Wheels as Manufactured at the Plant of the Buchanan Electric Steel Company, Buchanan, Mich.

THE manufacture of steel wheels for motor driven vehicles is growing even faster than the general use of steel is increasing in the arts. The use of electric steel furnaces in the preparation of metal for castings is now assuming the importance which it deserves. One of the first, if not the first manufacturer, to make use of this most up-to-date process was the Buchanan Electric Steel Co., of Buchanan, Mich., well-known manufacturers of Besco steel wheels for motor-driven vehicles.

Pioneer Users of Electric-Furnace Steel

This company was a pioneer in the manufacture of electric steel for this purpose, starting in 1911 on this work, and immediately developing a large foundry business on miscellaneous truck parts and machinery castings. About 1913, they entered on the manufacture of cast steel wheels, these however being of the spoked type rather than the present disc type. This gradually led to their originating and designing the present disc type of cast steel wheel. They also manufactured pressed disc wheels for light work up to 2 tons and even on 3-ton front wheels, but used the cast wheel for all heavy duty in sizes up to 7 tons. These wheels are also largely used for road construction trucks, for flanged wheels for trucks to be used on railroads and are now employed as tractor driving wheels.

Produce Finished Wheels

The wheels are sand blasted and cleaned, snagged and smoothed up, and are then



The Electric Steel Furnaces

These automatic furnaces are connected by flexible electric cables, the whole furnace being mounted on rockers so that they can be tilted by a special electrically operated mechanism. The furnace in the foreground is fitted with three electrodes, which form an electric arc between their tips and the surface of the metal to be converted into steel. For description of these furnaces see text.



Exterior View of the Buchanan Electric Steel Company's Foundry
Showing the siding and shipping facilities. This company is a pioneer in the use of the electric steel furnace for automobile steel castings

turned and finished with respect to the hub and rim, which are integral, so that when these wheels are used, no assembly work is required on the part of the car-maker. He merely inserts the bearings and slips the tire directly on to the metal rim of the wheel, which is turned to exact S. A. E. specifications.

In the accompanying illustrations are shown different views of the Buchanan factory. The foundry equipment is very complete, including a line of moulding machines, heat-treating ovens, electric steel furnaces and the latest improved machinery for cleaning and turning the wheels to size; in fact, one might say the latest equipment for quantity production. At the present time, 75 complete wheels are being turned out per day, and within a short time this will be increased to 100 a day. Over 10,000 of these wheels are now in operation according to General Manager E. B. Ross, who is also the designer of the present type wheel.

The work naturally divides itself into the foundry and the machine end, the machine equipment consisting largely of boring and turning machines. All the work is done by means of jigs and fixtures so

Interesting and helpful information; reputable advertisements—that's the CCJ

that the parts are absolutely interchangeable and when stock wheel patterns, suitable for any type truck axle are used, no charge is made for the pattern. Other types and styles of wheels are made to order.

Electric Furnace and Its Operation

Undoubtedly the most interesting feature in connection with the casting of these wheels is the electric steel furnace, which makes possible such strong thin section castings free from flaws.

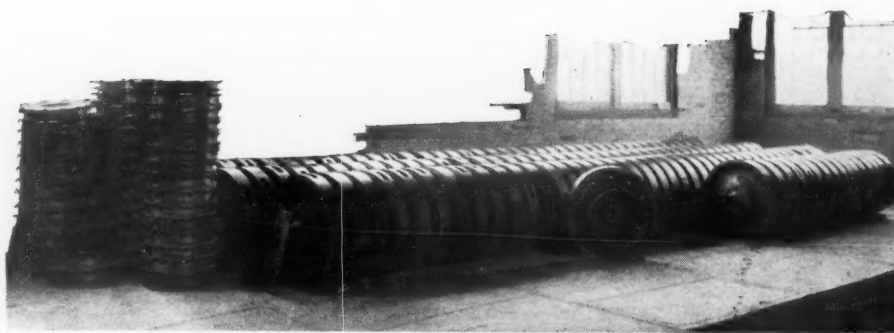
In the accompanying illustration is shown the external appearance of the furnace. These are round, with hemi-spherical heads and hearths. The lining may be either basic or acid, the basic lining consisting of magnesia brick with grain magnesia sintered in. Ten to twenty per cent. of open hearth slag is mixed with it to make it sinter more readily. The acid lining is of silica brick, dusted with silica sand. Protruding through the top of the furnace are the electrodes. The furnaces here shown are each of the 3-electrode type. Large furnaces use more electrodes arranged in groups of three. These electrodes vary in size, according to the furnace, those under consideration being about 10 in. in diameter and are made of either graphite or amorphous carbon. An actual arc is formed between the tips of these electrodes and the mass of metal in the furnace. Alternating current is almost exclusively used and the voltage is transformed at the furnace to that required, which is relatively low, varying between 45 and 100 volts. The usual practice is not to have the end of the electrode actually touch the metal but form an arc in the space between. When melting down the mass more heat may be used than when the mass becomes fluid, as the excess heat may melt the linings from the furnace. Static transformers are used, usually a single transformer or 3-phase with 3 electrodes or separate transformers may be used for each phase. The proper space is maintained between the electrodes and the metal by electrical automatic controls which feed the electrodes in or out of the furnace very much after the manner that the electrodes of an arc light are regulated.

Surrounding the electrodes on the roof of the furnace is a water-cooled collar, the cold surface condensing the fumes which arise, the smut assisting to make a tight joint. The rings which hold the electrodes are also water cooled to prevent their expanding by heat away from the electrode and thereby loosening their grip.

The entire furnace is provided with an electrically operated tipping mechanism, so that its contents may be poured into the kettles or ladles which are suspended from an overhead trolley.

The process divides itself into two periods, one during which the scrap is being melted down, and the other during which the purification and deoxidation of the molten bath is performed.

The advantages of the electric furnaces are: flexibility; it can be shut down over night or Sunday without damage to the furnace. The freedom of the steel



Finished Product

Corner of the shipping department, showing some of the smaller type wheels finished ready for shipment. These wheels are ready to have the rubber tires forced on and the bearings inserted at the center.

made by this process from oxides and its low sulphur content make it very desirable for small castings. Alloys may be readily added to the furnace; in fact, the entire steel-making operation is conducted within the furnace. It is comparatively free from blow holes and is very dense. Be-

cause of its uniformity and freedom from cracking, it can be subjected to great ranges of temperature when being heat treated. The ease with which an analysis may be made by drawing off a small amount and casting a test bar is another consideration.

Celfor Company's New Factory at Buchanan, Mich., Example of Ideal Conditions

THE plant of the Celfor Co. is unique in many respects, as will be seen by the accompanying illustrations. The surroundings are more or less ideal, the landscape gardening, the shrubbery, etc., converting the factory buildings into objects of beauty instead of the usual eye sores that so often bear the name of factory.

This company, now so well known as the manufacturer of the Celfor axles, was the originator of the high speed twist drill. In 1904 the manufacture of these drills was begun with three men, and was so successful that in 1912 it was decided to enter the field of automobile axle manufacture. M. R. Burrows, chief engineer, made a special study of the actual axle situation for two years, which resulted in his designing the present Celfor internal gear axle, which is now being produced in quantities. These axles are made in 1/2, 1, 2, 3 and 5-ton sizes. Real production was reached in March, 1915, at which time about 300 axles per month were produced.

The new building, which is 136 x 310 ft., it is estimated will increase this output to 1800 axles per month, and it is hoped to reach this production by January 1, 1917. The exterior and interior views of this building are herewith shown. The center bay is 50 ft. in width and 310 ft. long, and there is a wing at each side the full length of the building, giving an unusually light plant. Construction is of steel and concrete and the exterior finish is white, which, with the garden-like surroundings, produces a most pleasing effect.

There are several points of interest in connection with the arrangements of the

new building, the most novel of which is, perhaps, the method of supplying cooling solution to the various cutting tools in use in the machinery.

The roof of each bay slopes, instead of toward the outside, the opposite way, toward the center, forming a valley with the sides of the main roof. In this valley is a metal trough which catches the roof drainage. This prevents draining to the outside and does away entirely with icicles and water running down and blowing against the windows. The bottom of these troughs are exposed on the under side to the interior heat of the building which prevents the water from freezing. It is carried by these troughs to down-spouts which fill a central pool, the water being strained before entering this collector. At this point the ingredients are added, making a soda solution. Master pumps at this point draw up and force this cutting compound through pipes laid in channels in the floor of the building with outlets to each machine. All that is necessary is for the workman to turn on the stream and a single set of pumps, instead of a pump on each machine in the factory, does the work. The overflow then drains down by gravity into the covered troughs below the floor surface and runs by gravity back into the main well, passing through suitable strainers before entering same. In this way a complete circulation is maintained of cutting fluid.

The building is heated through a central plant, all of the piping and radiators being overhead, and is unusually light owing to the large number of windows.

The CHILTON ideal—honest circulation; results to advertisers—fully exemplified in the CCJ



Views of the Celfor Company's New Factory

The plant as it now stands has a floor space of 75,000 sq. ft. The buildings are all one-story, and additional land adjoining the site permits of expansion. The offices are of concrete and steel, with tile floors and partitions, and, contrary to the usual custom, the woodwork of the offices is finished in white enamel. The furniture throughout is of pressed steel, the whole making a fireproof a combination as possible. The location of buildings and conditions in general in this plant are almost ideal for the workmen and must militate toward good work.

Workmen on Premium Basis

Each man is given a certain amount of work to do as a base; on each piece he produces in excess of his amount he receives a premium. The base is so arranged that it enables the workmen to earn from 75 to 100 per cent. more than they formerly made.

The workmen are also permitted to share in the stock of the company. Each man is allowed to buy one share of stock at par value for each thousand dollars earning capacity he has. This system was started last September and within 90 days 100 men took advantage of it.

When the new building is in operation about 425 men will be employed.

The plant, as it now stands, has a floor space of 75,000 sq. ft. The buildings are all 1-story, and additional land adjoining the site permits of expansion. The offices are of concrete and steel with tile floors and partitions and, contrary to the usual custom, the woodwork of the offices is finished in white enamel. The furniture throughout is of pressed steel, the whole making as fireproof a combination as possible.



This Truck Can Be Used for a Number of Purposes

The illustration shows a GMC two-ton truck fitted with a novel body, that is in use at Burlington, Wash. It has a big water tank on its body which can be used for spraying fruit trees, sprinkling roads, or, in a case of emergency, for fighting forest fires or blazes in barns or dwellings. The engine of the truck will fill the tank in five minutes, and it can also be used to force the water out through the hose with great force.

Everybody who is anybody in the truck industry reads the CCJ

NUMBER OF TRUCKS IN NORTHWEST GROWING

By WARREN EUGENE CRANE

THE truck business in the State of Washington is one that is growing very rapidly because there are a large number of towns that are not reached by a railroad and in many cases where they do have a station, the trains run only once or twice a day. This state of affairs has made it very easy for stage lines and big five-ton trucks to carry passengers and freight back and forth between the large cities and the smaller towns within a fifty mile radius. This is especially true in Seattle, where big commercial trucks move families and their household goods to neighboring cities and towns. People are becoming less dependent upon the railroads every day and are sending their freight by big commercial trucks for the reason that they find it quicker and cheaper than any other mode of transportation.

The manufacture of motor trucks was begun in the Northwest during the past year and a half. The Gerlinger Motor Car Co., of Tacoma, Wash., with branches in Seattle, Wash., and Portland, Ore., has put out 26 Gersix trucks. R. L. Saunders, vice-president and sales manager, states that they are at present more than doubling their capacity, so that they will be able to place 200 commercial cars upon the market during the year of 1917.

The Star Carriage Co. is manufacturing the Northwestern Truck and put out twelve motor vehicles during the past year.

There are 16 automobile truck agencies in Seattle which are doing a big business. Those located in the city are in a majority of cases either branches of Eastern factories or general agencies for Western Washington.

After a careful investigation of the registration statistics of the Auditor of King County and the Police Department of the City of Seattle, the following statistics were obtained. There are 58,095 automobiles of every kind registered in the State of Washington and 10,529 of these are commercial cars, including those that are for hire, private trucks and stages. In the City of Seattle there are 971 automobiles for hire including both taxicabs and jitney busses; 1713 privately owned and operated commercial trucks; 438 trucks for hire and 61 stages. In the entire state there are 286 stages, 8157 trucks privately owned and operated; 2086 trucks for hire, and, exclusive of Seattle, there are 45,896 cars of all kinds, including pleasure and commercial, in the state.

Commercial trucks are coming into use in every line of business in Seattle. Laundries, department stores, cleaning and dyeing establishments, dairies, floral stores and business firms of every kind are displacing their horses with motor trucks, for they realize that they are not only cheaper, but also cover a greater amount of territory.



Members of Standards Committee and Guests at Bureau of Standards, Washington, D. C.

Top row: Henry Souther, Consulting Engineer U.S. Signal Corps; Professor Daniel Roesch; W. A. Frederick; C. W. McKinley; guest; Professor R. M. Anderson; Professor C. B. Veal; R. J. Nightingale; K. W. Zimmerschied; F. S. Dusenberg; A. D. T. Libby; W. H. Palmer, Jr.; W. H. Conant; E. H. Ehrman; H. G. Osburn; Arthur W. Kelly; E. J. Ross, Jr.; E. R. Whitney.

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COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

BIG ATTENDANCE AT OCTOBER MEETING

THE recent monthly meeting of this Association at the Hotel Adelphia was one of the most successful in point of practical interest in the history of the Association. On hundred and fifty members and guests were present and thoroughly enjoyed the speeches, which were of both business and humorous character.

Robert Tunis, president of the National Traffic Association, reviewed the development of transportation service made possible by the heavy motor truck. "Before the advent of the Interstate Commerce Commission," he said, "the railroads had an entire monopoly of freight transportation and held up the small shipper in a merciless fashion. The establishment of the National Traffic Service Bureau has done much to eliminate these abuses, but the freight charges on auto accessories are still notoriously high. It costs just three times as much to ship an automobile in parts as it does to ship it as a whole. This is a serious matter for the dealer in accessories."

Clement R. Clements, traffic manager of the Scott Paper Co., declared that transportation was "the block of the nation," and that for short hauls the auto truck was more and more taking the place of the railway or the horse van as a means of transportation. "In a motor truck of a carrying capacity adapted to his business there is a tremendous saving for the shipper and merchant," declared Mr. Clements.

F. M. Miller, of the North Broad Street Storage Co., declared that the motor truck was coming to its own as a means of long distance transportation. "Four times the amount of work can be performed with a motor truck as with a horse van," he declared, "and the saving is one not only of time but of money. The trouble is that the average buyer or driver doesn't know how to treat a motor truck and fails to get anything like the proper amount of wear out of one."

On the occasion of his resignation from the Association as press member, George M. Graham, of the North American, received quite an ovation. Mr. Graham goes shortly to take a position with the Willys-Overland Co., of Toledo, Ohio. "It is hard to sever these relations, which have been among the most pleasant I have ever known," he said, "but I am not leaving Philadelphia. Mother and the children will still be here. You know after so long a time a man gets tired of seeing other people wear good clothes, have plenty of money and keep no hours, so I determined I would try my hand at the automobile

game. One thing I am not going to do, and that is have my picture taken at the wheel of my favorite car with the monument at the entrance to Fairmount Park as the background. I have kidded two many salesmen about that in the past."

E. H. Frees, superintendent of the truck department of the Adams Express Co., declared that the experimental stage of auto trucks was over, and cited the fact that many users were sending them in fleets to points as far distant as Atlantic City, Bethlehem, New York and Wilkes-Barre for quick orders. He declared that a good truck driver was a rare find and was worth his weight in gold to his employer. "It is rare, indeed, to find brains driving a motor truck," he said, "and that is the reason motor trucks last only half as long as they should." Mr. Frees declared that many truck users made the mistake of attempting to use three-ton trucks where five-ton were needed, and the consequence was overloading and more expense for repairs.

Charles L. Huff, president of the Huff Paper Co., was the next speaker. Extracts of his speech follow:

It requires much patience to plant the acorn and to await the full-grown oak. The growth cannot be forced nor hurried. Nature must take her course, and she allows no interference, if we wish the best results. This is equally true in educating the public to advanced ways of conducting business. The seed must be planted, and only time can produce the harvest. Anxiety will not hurry it, and force means destruction. Man is slow in his growth and development, but man generally wishes to rush and hurry the things he wishes to do.

Those of us who have been accustomed to using horses and wagons to deliver our merchandise are sometimes slow in accepting advanced methods. We have to be educated.

In looking back, I can recall the time when few of us had telephones, and typewriters were not very plentiful at that time—only the big, prosperous business houses had them. I recall the first adding machine that I bought. The salesman had to do much explaining, and called to see me many times to convince me that I should buy an adding machine. I feared it was only an expense—something with which to ornament my office. We now could not conduct our business as intelligently as we do, without adding machines.

All of these things that have come to be necessities in our offices were slowly accepted—we had to grow into the new ways—we had to be educated to understand them and their uses.

I remember the first truck I bought. There was no one in our line of business in Philadelphia that had one. It was a wonderful day when that truck was put on the street. All our salesmen, clerks and warehousemen considered that it was just a little adver-

tising, and that the expense would be tremendous, and teams were cheaper—and that using motor trucks in the paper business could only be a fad. So strong was this sentiment in the paper trade that for a time I almost believed I had made a mistake, and that I had slipped a cog in good management. Since then, as you know, we have bought several, and now we use nothing but trucks. To go back to the old way of handling our paper and paper bags would indeed be a hardship.

True it is that one cannot get at the exact cost of the delivery of his goods by trucks, in comparison with teams. So many things enter into the calculation—trade increases—prices may not be the same—and I really do not know what it would cost us now to have only teams. But trucks have become such a necessity that no comparison is attempted by us. I do know, however, that less complaints come to my ears from our delivery department than have ever come during my many years of business experience. I would think it just as advisable to do away with typewriting machines in the office as I would to do away with trucks with which to deliver my merchandise. We could write our letters with pen and ink—we could haul our goods with old horses and broken-down wagons—but it would not be in keeping with business progress. We would not be up-to-date, and one has to keep up-to-date with everything, or he soon becomes stale and a back number, and is laid away on the shelf.

The delivery of merchandise by truck has become such a necessity that I believe a salesman does not now have to take up this line of argument with his prospects. How true it is that progress is a slow growth. I am using this phrase much, I notice, but it cannot be used too much. It is well that we all keep this fixed in our minds, that things cannot be hurried nor forced to be natural, and that it is well for the opposing forces to make us prove our way. The opposition that we encounter when putting new ideas on the market is right—should be so. First let us prove to the world that we have something of advantage for the world, before expecting to be received with open arms.

The story of the struggle of the railroads is quite interesting and instructive. Young men in different cities of the United States held debates as to the possibility of railroads. During this period there was a wise old judge in Wellsville, Ohio, who refused the use of the court-house to the young progressive business men of his town in which to debate the possibilities of railroads, and he wrote a long decision and went into the matter carefully with the young men. He told them he did not think it was right that they should use the court-house to debate such questions as railroads—that it was beyond the ken of reason to suppose that a man could fly through the air at the rate of fourteen miles an hour, and as custodian of the court-house, he could not allow its use for such irreverent discussions. He said if

Merit wins—that's why the CCJ is the leader

the Lord in His wisdom had thought that men could travel through the air so fast, some mention would have been made of it in His Holy Book, and as he found none recorded there, he must refuse the loan of the court-house for the debate.

We are now traveling over a mile a minute on railroad trains. They are quite a necessity. I remember reading one time of the first steamship that sailed across the briny blue ocean. It carried with it a volume written by an eminent scientist of London, stating the impossibility of such a feat. This book and many others were in the library of the boat that accomplished the feat.

Back many, many years ago, when Philadelphia was contemplating burying gas pipes, having them run under ground, there was a protest that went up from its citizens that hindered the work for many years. They said that to run gas pipes under the city meant that some day Philadelphia would be blown up. They said it was not practical.

Everything that means advancement to the human race has to slowly fight its way to the front, from the clock to the wireless telegraph. The man who invented the first clock had his eyes plucked out, and even the man who invented the common cook-stove was burned at the stake.

I give these few illustrations only to show in my judgment that it is no longer necessary for a salesman to take up a line of argument on the necessity of the use of trucks. He can omit this part of his speech, and save his energy for something more necessary.

I have been in active business for twenty-eight years, hiring and firing salesmen. There are many manufacturers of paper and paper bags, and our salesmen cannot use the argument that our bags are better than any others on earth. Some men just starting into business might be caught by this line of argument, but the big trade—men who make their own decisions, know that a salesman is simply talking as a father talks about his children.

Now, the question naturally arises: What should a salesman talk about; what arguments should he use; what can he say to a customer to influence him to buy his truck?

I suppose those who are in the kindergarten stage of salesmanship and so firmly believe in arguments must have them. You cannot take all their ammunition away from them, and until they learn the power of suggestion, the power of harmonious transaction, they must be supplied with other ammunition. The man who wishes to make a great success in his business as a salesman must slowly grow out of this into more advanced ways.

I always treat these arguments that salesmen use as I would a circus parade. What would a circus be without a parade? How many of us would know it was in town? So the circus parade is advertising the fact that the circus has arrived, while the elephants, camels, clowns, ponies and the girls in beautiful costumes—all tend to give us the circus desire.

The average salesman is very much in this position with his house. The good, live, enthusiastic, up-to-date salesman lets us know that his house is in existence, and that his house wants our business, and that his house agrees to take the very best care of us that can be expected, and that from the owner down to the office boy, it has but one intent, and that is to see that their customers are satisfied and taken good care of. This is some of the ammunition that a live, up-to-date salesman uses.

There are other guns that will come natural to a live salesman's mind—some fourteen inch, some sixteen inch, some eighteen inch—the bigger the salesman the bigger his guns, and the sooner he grows out of the kindergarten stage. This is nothing derogative to a salesman—that he is simply advertising the house. This is only classifying him—putting him where he belongs—wherein lies his power. I remember in my early business days we used to hire salesmen who were professional fun makers. They always had a lot of new jokes on hand, and when they called upon the country merchant, the country merchant expected Bill to have a joke for him, to make him laugh, to cheer up his business, and if Bill did not have one that suited him, he told Bill there was "nothing doing today; he did not wish anything." As a matter of fact, he was waiting until the next fellow came along, with a good joke, and then if he laughed enough he gave the other fellow the order. He wished to be entertained. Of course, at this time the vaudeville houses had not come to be, and the traveling salesman merely took the place of the vaudeville show.

Now we have moving pictures, and a salesman should keep on the "move," displaying his goods. Things have all changed. We have no time to entertain the joker. We have this done for us by professionals. We have no time to listen in business hours to vaudeville entertainment. We do that in the evening. We do not wish our thought to be derailed, even for a short time. Office hours are not so long with the managers now as when I first went into business. We worked from seven to seven, and of course we had some time to devote to entertainment. But now we go to our business, transact it, and go home, and are entertained in the evening.

So all merchants have come to look at a real salesman as a message-bearer, to tell us what his goods are—to answer our questions; and that salesman who is the best posted, and can give us the clearest, most concise details, is the most welcomed in any business office.

It cannot be many years before the salesman, such as we know him today, will pass

away. More and more they are becoming a sort of a traveling show window, and we all know what the show window means to a department store—it invites the customer to please step inside. Some houses even now do not have salesmen—some of the very biggest houses—that is, individual salesmen. There are other methods. But as I am not talking on the subject of advertising, we will let these methods alone. We will not introduce this subject.

In my judgment, that salesman is most proficient who works the hardest, keeps adding new prospects to his list, calling upon his customers with regularity, taking nothing for granted, talking but little, but letting the customers know that the circus is in town, and that all people who like circuses should go. We expect a salesman to have a large acquaintance, and the only way he can get this is to get around to see the people. We advertise in magazines, and pay according to the circulation. This would be well for the salesman to consider—see how big a circulation he can get—see how many people can know what truck he is selling, and how much he knows about this truck.

"Work, and work hard, for work will accomplish greater results than your genius without work."

The Motor Truck Association of Philadelphia is a growing institution and owners are beginning to realize that it is to their advantage to belong to the Association. The secretary, W. H. Metcalf, declared that almost every day he receives calls for heavy hauling propositions that had to be undertaken at once, and they never had the members fail them. For instance, at six o'clock on the evening of the return of the First Regiment Armory to Philadelphia, Colonel Allen requested that six 5-ton trucks be supplied by the Association at eight o'clock the next morning for the purpose of hauling their equipment from the railroad station to the Armory. The six trucks were on the job at eight o'clock the next day.

"Use a truck and save half your hauling expense" is the slogan of the Association.



Ten Trucks Displace Twelve Vehicles and Twenty Horses

Five years ago the Willis Transfer Company, operating at Grand Rapids, Mich., used twenty horses and twelve vehicles in prosecuting the daily business. Now eight light trucks and two heavy trucks care for all the business. Although no concrete figures are obtainable, officials of the company declare that the cost of operation is less and that the increased efficiency is a continual source of profit. With the trucks a service is maintained which previously was impossible. The company, with its trucks, makes a popular bid for all rush calls and is monopolizing the business to a large extent.

The CCJ is built upon the lasting foundation of honest circulation

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C. A. MUSSELMAN, Treas. and Gen'l Mgr.
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OUR TRACTOR SECTION

IT WILL be noticed by our readers that we have introduced in this issue a department or section known as the Chilton Tractor Journal, devoted exclusively to the Farm Tractor. These modern implements are patterned largely after the automobile. Their power plants are almost identically the same as that of the truck; the parts and accessories are most intimately associated with the automobile industry. It is believed that these vehicles can be and will be advantageously handled by automobile dealers, garagemen and repair shops located in the outlying districts and in close touch with the farming communities. These men will share the retailing responsibilities with the implement dealers. The automobile man, however, as a rule, has the advantage of a training in quick sales and is accustomed to receiving goods with sight draft attached to bill of lading and is usually far better equipped for giving service in connection with the vehicles that he sells. As he is an automobile user, he is more mobile and can more readily scour his territory and keep in touch with not only his prospects but his customers. We believe there is a big future for the sale of tractors and that the automobile men should embrace it.

The tractor section will be a regular feature of the COMMERCIAL CAR JOURNAL. We welcome any articles or suggestions for its improvement.

WILL THERE BE A SHORTAGE OF LIGHT-TRUCK AXLES?

THE truck builders of the country are hampered, and have been for more than a year, by the difficulty of obtaining materials and parts. It is bad enough for the manufacturer that turns out his own parts to his own designs, as the material market has been very difficult, but to the maker who is, to a large extent, an assembler and is dependent upon somebody else for complete units, such as engines, axles, etc., the situation is even more complicated and today such makers are actually experiencing a curtailment of production because they cannot obtain suitable axles fast enough.

There is, at the present time, in the commercial car industry the most dire need for increased production of these most essential rear constructions. The light truck makers are doubling, trebling and even quadrupling their output and axles are consequently more difficult to obtain.

There is every indication that unless more of the small truck builders manufacture their own axles or use pleasure car parts, it will be absolutely impossible for them to live up to the schedules which they have set for the coming season. It looks very much as though there were to be a shortage of light commercial car rear axles. This is an opportunity for the established parts maker who has equipment which will enable him to enter this field.

WHY ARE INSURANCE RATES ON CHAUFFEURS LESS THAN ON HORSE DRIVERS?

THE recent Workmen's Compensation Law for Pennsylvania brings out the interesting fact that the insurance rate for drivers of horse drawn vehicles is \$1.20, while that of chauffeurs or those operating motor driven vehicles is only \$1.05.

Insurance companies base their rates on percentages, which in turn are based on statistics obtained from actual conditions covering extended periods. According to the insurance companies, and as shown by the rates which they have established, the percentage of accidents which affect the driver, is much greater with horse drawn vehicles than with motor driven vehicles, just the contrary to what the general public is usually led to believe.

Facts are sometimes difficult to obtain, but when we have them we must not overlook their significance. Just because accidents to motor driven vehicles are more spectacular and the wreck makes a better subject for the camera man and the local reporter than is the case with the comparatively slow-moving horse vehicle, we must not be misled into the belief that the horse vehicle is so much safer than the motor driven vehicle.

Make your product pay—advertise in the CCJ

RAILROAD CAR SHORTAGE EMBARRASSES SHIPMENTS

FOR the last two months the shortage of box cars has been growing more and more into a peril to the automobile industry. At the time of this writing, the shortage is acute. The sad part of the whole affair is the fact that such a shortage is not absolutely necessary, but is largely due to the failure to return cars to their home lines. This is attributable to ineffective system.

Every effort has been made by the railroad officials, who are holding conferences in different cities, to unravel the difficulty which has resulted in the car shortage.

The parts and complete truck makers can assist in preventing a further shortage and in eliminating such contingencies in some measure by following up and keeping track of their shipments and by more compact packing in the case of the parts people. They can also assist by not tying up cars longer than actually necessary, either in loading or unloading. It is always profitable to investigate and if possible increase the efficiency of the loading and unloading system employed.

MOTOR TRANSPORTATION SUCCESS MORE DEPENDENT UPON DRIVER THAN VEHICLE

FROM time to time, in our columns, we have reiterated the fundamental fact that the success of motor transportation is more dependent upon the driver than upon the vehicle.

The average 1916 truck is quite efficient. The same cannot be said of the average driver. Although there are many more experienced men than formerly, the remuneration is much less, and a large number of incompetent men are operating. Examples of the incompetency of the driver are to be seen every day. The writer recently saw a driver, due entirely to ignorance, allow a truck to skid so that it landed head on into an elevated post, damaging very badly the frame and radiator. The disastrous results of the skid could have been entirely avoided if the driver had known the first thing about his business.

In an article in this issue will be found some further facts concerning the important part the driver plays in the success of the vehicle.

Metal and Rubber Markets

Pressure on Steel Mills Unabated

The tremendous demand for steel is reflected in the fact that the new capacity which will come into play within the next two months has practically all been contracted for. Railway equipment continues as one of the brilliant features of the market. Inquiries for over 20,000 cars are now in the market. The upward movement in steel prices was featured by a \$2 advance in bars, plates and shapes, making plates 3.10c, shapes 2.80c, and bars 2.70c Pittsburgh, this advance being made by the Steel Corporation, while some independent mills put bars up to 2.85c. Billets, which have been holding at a minimum of \$45 a ton mill, were advanced to \$50 a ton mill. Forging billets advanced to \$75 a ton mill. Sheet prices also advanced \$3 to \$5 a ton. Quotations on November 8th were:

Steel Products Prices

Bessemer billets, per ton, mill..	50 00 a	.....
Open hearth, per ton, mill ..	50 00 a	.....
Sheet bars, per ton ..	50 00 a	.....
Forging billets, per ton, mill..	75 00 a	.....

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill; smaller lots are \$2 per ton higher:

Blue Annealed Sheets—		Cents per lb.
Nos. 10 to 12.....	3.15 a	3.25
Nos. 13 and 14.....	3.00 a	3.10
Nos. 15 and 16.....	3.05 a	3.15

Box Annealed Sheets, Cold Rolled—

Nos. 17 to 21.....	3.20 a	3.30
Nos. 22 and 24.....	3.25 a	3.35
Nos. 25 and 26.....	3.30 a	3.40

Galvanized Sheets of Black Sheet Gauge—

Nos. 10 and 11.....	3.90 a	4.00
Nos. 12 to 14.....	4.00 a	4.10
Nos. 15 and 16.....	4.15 a	4.25
Nos. 17 to 21.....	4.30 a	4.40
Nos. 22 and 24.....	4.45 a	4.55
Nos. 25 and 26.....	4.60 a	4.70

Above prices are for Bessemer stock. For open hearth stock \$2 per ton advance is charged.

Iron and Steel at Pittsburgh

Bessemer iron, Valley furnace. 26 00 a	.....
Bessemer steel, f.o.b. Pittsb'gh 45 00 a	.....
Skelp, grooved steel	2 70 a 2 80
Sheared steel skelp	2 80 a 3 00
Skelp, grooved iron	2 70 a 2 80
Sheared iron skelp	3 00 a 3 10
Ferromanganese (80 per cent.),	
seaboard	162 00 a165 00
Steel, melting scrap	19 00 a 19 50
Steel bars (contracts)	2 85 a
Black sheets, 28-gauge	3 40 a 3 60
Galvanized sheets, 28-gauge...	4 90 a 5 20
Blue annealed, 10-gauge	3 00 a 3 25
Tank plates, ¾ and heavier....	4 00 a

Prices of New Metals

The demand for copper and brass continues heavy and prices are firmly maintained. The demand for aluminum is rather quiet. The following prices are all f.o.b. mill. The high and low prices bid between the period of October 6th to November 8th are given herewith.

	High	Low
Sheet zinc	16 00	15 00
Sheet aluminum, 1917 contract. 40 00	40 00	40 00
Sheet aluminum, outside market, prompt shipment	85 00	80 00
Copper wire	31 50	31 00
Sheet copper, hot rolled	37 50	37 50
Sheet copper, cold rolled	38 50	38 50
High brass sheet, wire and rods 40 00	40 00	40 00
Low brass sheet, wire and rods 40 00	40 00	40 00
Bronze sheet and wire	40 00	40 00
Bronze rods	40 00	40 00
Brazed brass tubing	45 00	43 00
Brazed bronze tubing	47 00	46 00
Seamless copper tubing	43 50	42 00
Seamless brass tubing	42 50	42 00
Seamless bronze tubing	43 50	43 50
Full lead sheets	9 00	8 50
Cut lead sheets	9 25	8 75

Prices of Old Metals

Sellers report that the situation is unchanged with respect to demand and prices. The market is firm with a fair amount of business moving.

Copper—	Cents per lb.	
Heavy cut and	Buying	Selling
crucible	24.50 a25.00	26.00 a26.25
Heavy & wire.23.00	a23.50	24.75 a25.00
Light & bott's.19.00	a19.50	22.00 a22.50

H'y mey, comp.18.00	a18.50	19.50	a20.00
Brass, heavy ..13.00	a13.50	13.50	a13.75
Brass, light ...10.50	a10.75	11.50	a12.00
No. 1 clean brass			
turnings	13.50	a14.00	14.50 a15.00
No. 1 composition			
turnings	15.50	a16.50	16.50 a17.50
Lead, heavy ... 6.00	a 6.12½	6.40	a 6.62½
Tea lead	5.37½a	5.50	5.75 a 5.85
Zinc scrap 6.25	a 6.50	7.37½a	7.50

The buying prices are those which the larger dealers will pay, the selling prices are market quotations to consumers.

Rubber Prices Rise

Quite a rise in Para rubber has taken place since our last report. Prices are so high, however, that buyers are not showing much interest, buying only for current needs. There is very little Para up-river fine available for shipment earlier than January-March, on which position 72c is quoted. For immediate delivery 82 cents is quoted. Quotations below are the highest and lowest bid during the period from October 5th to November 8th:

	High	Low
Para—Up-river, fine, per lb.....	83	71
Up-river, coarse	44	42½
Island, fine	67	65
Island, coarse	32	29
Caucho, ball, upper	46	43
Caucho, ball, lower	45	40
Cameta	35	31
Ceylon—First latex, pale crepe..	66	60
Brown, crepe	60	54½
Smoked sheets	65	59½
Centrals—Corinto .....	..	..
Esmeralda .....	..	..
Guayule	32	32
Balata, sheets	70	70
Balata, black	64	61½
Mexican—Scrap .....	..	..
Frontera .....	..	..
African, Massai, red	53	53

Domestic Scrap Rubber

Tires—Automobiles	6½
Bicycles, pneumatic	4
Inner tubes, No. 1.....	24
Inner tubes, No. 2.....	10½
Red	10½

For its readers—information; for its advertisers—results. That's the purpose of the CCJ

ALLEN COMPENSATING AXLE

A compensating non-skid axle, one that contains a positive drive to both rear road wheels as well as eliminates the gears utilized in the conventional types of differentials, has been brought out by the A. C. Axle Mfg. Co., Philadelphia. The possibilities of the drive were demonstrated recently in New York City in a Winton car which was driven over an asphalt pavement that was sprinkled to reduce traction to the minimum. The tests were conducted before the automobile editors of the New York Press and the representative of the COMMERCIAL CAR JOURNAL. The tests included sharp right angle turns at a rate of 20 miles the hour from a side street to the wetted pavement, a figure eight and the application of the brakes. Aside from a very slight slip of the tires when making the right angle turn, the car held true to its course and without skidding, although the surface was greasy and uneven.

The Allen drive differs from the conventional spur or bevel gear differential in that the energy of the engine is imparted to both driving axles and prevents one wheel from rotating in a direction opposite to that of the other, a condition obtaining with the conventional gear differential. In other words, the inventor, John D. Allen, states that the pivotal point obtaining with the gear differential is eliminated. The Allen drive also differs from the usual method in that the assembly becomes practically a solid axle taking the drive equally, whereas with the gear differential the drive is on the side having the least resistance.

The usual pinions, spider and gears are replaced in the Allen drive by clutches

members N, N, and springs M and K tend to move the clutches outward, their function being to mesh the clutches A with B as well as to prevent any dead centre of the jaws. With the assembly complete as shown at Fig. 1, the construction obtains a solid drive, the energy being transmitted through the main axles N to the clutches A, thence to the clutches B to the hubs H which take the squared end of the floating axles of the car.

With the car moving forward in a straight line the main axle with its clutches assume the position shown at Fig. 1. With

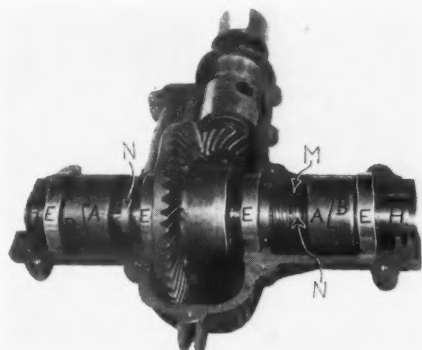


Fig. 1. The Allen Axle

This axle eliminates gears, obtains a positive drive to both road wheels and is said to prevent skidding, by the use of clutches.

the vehicle turning a corner, the wheel on the short curve drives while the outer member compensates, the hub H with its clutch B compensating the difference. The inner or driving member does not reverse

with the elimination of gears and few wearing parts which are easily lubricated; a solid driving construction that will drive the car with one axle or one chain and adaptable to pleasure and commercial cars, chain or shaft driven; positive drive for both wheels, preventing the spinning of the wheel offering the least resistance as with the conventional gear differential; a large reduction in friction losses; perfection compensation when turning corners; the maximum of traction and no skidding; economy of fuel and tires and not affected by improperly adjusted brakes; that is, one loose and the other dragging.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Commercial Car Journal, published monthly at Philadelphia, Pa., for October 1, 1916.

State of Pennsylvania,
County of Philadelphia, ss.:

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:
Publisher, CHILTON COMPANY, 49th and Market Streets, Philadelphia, Pa.
Editor, James Artman, Narberth, Pa.
Managing Editor, E. S. Foljambe, Drexel Hill, Pa.
Business Manager, C. A. Musselman, 4203 Pine Street, Philadelphia, Pa.
2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.)
James Artman, Narberth, Pa.
George H. Buzby, 4412 Walnut Street, Philadelphia, Pa.
C. A. Musselman, 4203 Pine Street, Philadelphia, Pa.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also, that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.

Sworn and subscribed before me this 21st day of September, 1916.

GEORGE H. SHEVLIN.

(Seal)
(My commission expires April 1, 1917.)
Form 3526-Ed. 1916.

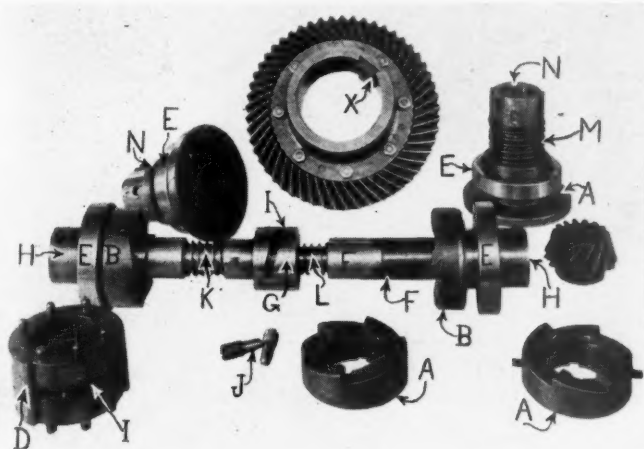


Fig. 2. The Compensating Gear

The Allen compensating gear disassembled to show its components and their relation to one another.

three in number, two of which are employed for propelling the car forward and the third for obtaining the reverse. The completed axle is shown at Fig. 1 and entirely disassembled at Fig. 2. It includes the conventional pinion and gear, but instead of the gear being bolted to the case as with the differential it is provided with a substantial key X which imparts the drive to the inner drive hub D. This hub slips over a cam block G which operates the internal reverse clutch. The hub D has a number of studs and the main axle members N have holes registering with these studs. The clutches A, A, have slots and are mounted and keyed on the main axle

or move backward as the clutches A and B are in engagement and driving. The reverse is obtained by the clutch F, F, a cam block G operating the clutch slots I and pins J. The springs K and L automatically control the reverse drive clutch and the left hand forward drive clutch. As these springs are employed only for obtaining the mesh of the clutches, and perform but little work, the wear is negligible. The clutches are hardened, and the axle is supported by the bearings E on either side of the driving hub, and the hubs H have similar bearings.

The advantages claimed of the Allen compensating axle are: A simple design

Why is the CCJ the only truck paper a member of the Audit Bureau of Circulations? Here's food for thought

CCJ GALLERY of SALES MANAGERS

C.J. HELM
SALES MANAGER
CADILLAC MOTOR TRUCK CO.
CADILLAC, MICH.

THEY BOSS
AFRAID YER IDEA
HOT WILL BOIL
OVER SOME DAY

THE MAN OF IDEAS

C.W. HATCH
SALES MANAGER
PERFECTION SPRING CO.
CLEVELAND, OHIO.

THIS
SPRING
IS
PERFECTION
ALL
RIGHT

WONDER
IF HE HEARS
THIS STYLE
SPRING OR
THIS SPRING
STYLE

WITH THIS SPRING BEHIND HIM.
HOW CAN HE HELP BUT RISE.

W.F. PARKER
SALES MANAGER
THE PACKARD ELECTRIC
COMPANY
WARREN, OHIO.

THIS USED TO BE
A VACANT LOT
NOW LOOK AT IT

COME ON
WE KNOW
YOU ARE
AN
ARCHITECT

THEY DONT
SEEM TO BE
ABLE TO PUT
THEM OVER
ON HIM

THE ORIGINAL LIVE WIRE

H.J. LEONARD
SALES MANAGER
MOLINE PLOW CO.
FREEPORT, ILL.

HURRY
JAMES
TAKE ME
TO SEVENTH
HOLE AS
QUICK AS
YOU CAN

ELL! WHATS
THE USE

COMPETITOR

HIS BUSINESS STROKES ARE JUST AS DIRECT.

FRANK T. CHASE
SALES MANAGER
FRANK MOSSBERG CO.
ATTLEBORO, MASS.

AIN'T HE GRAND
SO DIGNIFIED
AND
DIPLOMATIC

YES AND
SO
AGREABLE
TOO

GENTLEMEN
WHAT DO YOU
THINK OF MY
CHEST

ARTIST'S NOTE
THE STENOGRAPHERS
ARE REALLY GOOD
LOOKING BUT
MR. CHASE IS A
MARRIED MAN &
THE ARTIST TOO
SO THERE'S A REASON
SAFETY FIRST

THE ONLY WRENCHES IN THIS DEPARTMENT ARE METAL.

GEO. L. LAVERY
SALES MANAGER
WEST STEEL CASTING CO.
CHICAGO, ILL.

ON LOOK I
BELIEVE, I'D
WANT TO TRY
THE NEXT

NOW FOR A
LONG
THROW

THROW ME
A WHEEL
YER
INSTEAD OF
A HOLE

HE RINGS THEM EVERY TIME

An Accounting System for Dealers

By WILLIAM B. WILSON. Text by C. P. SHATT K

(Copyright 1916, William B. Wilson)

BILL SMITH, from Henderson & Co., was in this afternoon and wants to trade in that 3-ton truck of his for that 5-ton Runwell in the shop," said the junior member of the firm of Hustle & Sellem, truck dealers.

"Well, I hope you closed the deal, for I want to turn that Runwell into real money."

"Nothing doing. Smith looked over the Runwell and says, 'Make the price close and the trade right for the "Efficiency" truck man has made me an attractive offer. And make it quick for I want this truck to be on the job tomorrow morning.'

"Give it to him. It is practically all ready and with a little overtime we can deliver."

"True enough, but how in the world could I bid against the Efficiency people without knowing what the Runwell stands up? There's been a bunch of work on that wagon, tried to get a line from the bookkeeper, but he said I'd have to wait until he looked up all of the charges, cost of new parts and labor bill. Said it would take him at least a couple of hours, but Smith said, 'I can't wait. I'm in a hurry. Perhaps I'll drop in later this afternoon.'"

Whereupon the senior member sent a hurry call for the bookkeeper, while the junior member visited the repair shop to get the charges on the Runwell. After much searching of the various accounts it was ascertained that the Runwell stood the firm \$1500 in a trade-in, had earned \$150 in rental, had \$15 charged up against it for demonstrations, a repair bill of \$25 because of an accident, \$75 for new parts and 60 hours labor. In addition, the bookkeeper suggested a reasonable charge be made for overhead expenses such as rent, light, heat, power, insurance, advertising, etc., items previously charged up to general expenses. After several hours of figuring,

the cost of the Runwell was ascertained, but in the meantime it was learned Bill Smith had traded in for an "Efficiency Truck."

The moral is that a distributor, agent, dealer or sub-agent should have instantly available all data relating to the cost of any car in which he has an interest or owns. A prospect should not be obliged to wait an unreasonable length of time for an estimate, and it is not always possible to hold a customer while looking up the data, for as in the case with Bill Smith, the truck traded in was a car sold by Hustle & Sellem a few months previous. Had it been another make it would have been a simple matter for the firm to have the costs estimated, while the truck to be traded in was being inspected and appraised.

By the term "instantly available" is meant that any salesman or member of the firm can ascertain in a few minutes the cost of any vehicle in the store, either new or second hand. If a second hand car, one that has earned money in rental work or has within a day or so had some minor repairs or adjustments made, the cost of such should be as quickly available as if the work had been completed weeks before and the machine standing on the floor as a completed job. The lack of such data may be viewed from another angle—that of the loss of the sale to Bill Smith for example. Many small items that should be charged against a second hand truck are overlooked. These are leaks, small ones it is true, but as they amount to a considerable sum at the end of the fiscal year, they should be eradicated.

These leaks can be prevented and business accelerated by the use of an efficient accounting system. The writer is well aware that there is such a thing as too much system, that some require a large

clerical force to maintain them and that the cost does not always measure up to the benefits derived.

The Accounting System

The accounting system described herein and which will be presented in serial form accompanied by the forms utilized, is the creation of William B. Wilson, secretary and efficiency expert of the R. E. Taylor Corp., New York City, eastern distributor of the Garford line of trucks.

Advantages of System

One of the interesting features of the system is its simplicity. It is as applicable to the small office as the large, and can be maintained by one bookkeeper. It can be adapted to a company maintaining any number of branches or having control over sub-agencies, and an advantage of the system is that each branch is made independent of the main office, yet is controlled by the latter, which receives duplicate sheets of the various forms at the close of each working day. This keeps the main office fully informed as to exactly what takes place and in detail, at each branch.

Information is instantly available as to the cost of any car or truck in stock, in the repair shop, etc., and includes figures as to the cost of repairs, etc., being made up to the time the data is required by a salesman or sales manager. Not only is the system of value, insofar as its financial end is concerned, but it includes means for keeping an accurate record of all trucks in and out, as well as those for preventing the use of trucks for others than those intended.

It provides the sales manager with a daily report of existing conditions, such as the stock of new and second hand cars, progress and cost of each salesman, expenses incurred by sales; in fact, every detail of value to the sales manager is

SUB-CONTROL CLASSIFICATION OF

EXPENSES CONTROLLED BY ACCOUNT 30

TOTAL THIS MONTH	Account Number	TITLE OF ACCOUNT.	A	Administration	S	Selling	G	Garage & Shop	TOTAL FOR THIS YEAR
	1	Salary and Labor	1		1		1		
	2	Salesmen's Commissions	X		2		2		
	3	Heat, Light and Power	X		3		3		
	4	Rents and Warehouses	X		4		4		
	5	Postage	X		5		5		
	6	Telephone and Telegraph	X		6		6		
	7	Printing and Stationery	X		7		7		
	8	Employees, Travelling and Entertaining	X		8		8		
	9	Express and Freight	X		9		9		
	10	Freight on Automobiles	X		10		X		
	11	Interest, Discount, Exchange (Paid Out)	X		11		X		
	12	Taxes, Insurance, Licenses	X		12		12		
	13	Advertising, Shows	X		13		X		
	14	Service Cars, Demonstration Upkeep	X		14		14		
	15	Depreciation, Worthless Accounts	X		15		X		
	16	Petty and Perishable Tools	X		16		16		
	17	Legal Advice, Collections, Etc.	X		17		17		
	18	Officers' Travelling and Entertaining	X		X		X		
	19	Cars	X		19		19		
	20	Policy Account	X		20		20		
	21	Prizes, Salesmen	X		21		X		
	22	Delivery Charges and Demonstrations	X		22		X		
	23	Drawing Account, Salesmen, Liquidated	X		23		X		
	24	Policy Guarantees (Outside Commissions)	X		24		X		
	25	Employees' Club Entertaining	X		X		X		
TOTALS									

X Indicates No Charge to the Department.

Form to Show Total Expenses to the End of the Previous Month

The above statement shows the gross total of all expenses from the beginning of the fiscal period up to the close of each month

Interesting and helpful information; reputable advertisements—that's the CCJ

instantly available. The heads of the various departments are provided with means for checking up the work of their employees, as a record is maintained of every transaction.

Daily Trial Balance if Desired

One of the desirable features of the accounting system is that a trial balance can be obtained daily if desired. While it may appear that to provide all of the above named features, that the system involves considerable labor and time, it eliminates to a marked degree the clerical work that is attendant upon the average system.

Relative to the forms utilized, all sheets are of the loose leaf form and are in the following order: Cash, pay roll, petty cash distribution, petty cash vouchers, sales, sales contracts, sales delivery, salesmen, commission reports, shop with job order and costs and miscellaneous reports. There is also a purchase register with combination journal form, also department and stock requisitions. Probably the most interesting and valuable feature, insofar as the selling end is concerned, is the stock record, which makes use of visible index cards which cover all details of new and second hand cars and consigned vehicles on hand or its entire history.

In addition to the forms enumerated, samples will be illustrated of those utilized for parts, supplies, etc., in the repair shop and stock room. The following forms will be financial statements governed by the main controlling accounts, abstracts from purchases and sales, these sub-divided under the head of sub-controls. They will include abstract accounts receivable and payable as well as provide a detailed statement of expenses, showing the total expenses of the month, including administration, selling, garage and shop expenses. Also a statement showing the gross total of all expenses from the beginning of the fiscal period up to the close of each month. Other miscellaneous forms of interest and value will be submitted in the article, and the following financial classification of controls and sub-controls is presented for a careful study before presenting the series of forms used.

Debit Controls and Sub-Controls

Control Account Number	
1	Cash on Hand.
2	Cash in Banks.
3	Office Furniture and Fixtures.
4	Garage Fixtures and Tools.
5	Notes Receivable.
6	Accounts Receivable.
7	Deposits with Manufacturers and Bids.
8	Contracts and Rights.
9	Treasury Stock.
10	Branch Houses—
	A Boston.
	B Newark.
	C Brooklyn.
	D Mineola.
11	Prepaid Insurance, Rents, Etc.
12	Buildings, Real Estate, Leaseholds, etc.
13	Reserve Fund—Notes Receivable.
14	Inventories—Under Schedule, Covering Service Cars and Demonstrators on Hand.
15	Purchased Stock. (See Sub-Controls).
30	Expenses—
	"A" Administration
	1-25 Sub-Control Accounts.
	"S" Selling
	1-25 Sub-Control Accounts.
	"G" Garage and Shop
	1-25 Sub-Control Accounts.

Credit Controls and Sub-Controls

Control Account Number	
16	Capital Stock—
	A Common Stock.
	B Preferred Stock.
17	Notes Payable.
18	Accounts Payable.
19	Script Dividends.
20	Dividends.
21	Deposits from Dealers and Customers.
22	Surplus Profits and Losses.
23	Officers' Private Accounts.
24	Contingent Liabilities Under Schedules A, B, C, Etc.
25	New York—Used by Branch Houses Only Under Classification, A, B, C, D.*
26	Stock—Premiums and Discounts.
27	.....
28	.....
29	Past Period Adjustments.
30	Trading Accounts. (See Sub-Controls).
30	Income Accounts. (See Sub-Controls).

*It will be noted that Account 10 at the main office represents a resource and Account 25 at branches represents a liability. The Consolidated Balance Sheets will wash Accounts 10 and 25 if in reconciliation.

Sub-Control Classification of Purchased Stock Controlled by 15

Dr. 15-100 New Trucks and Bodies from Purchase Register.

Dr. 15-100 "A" New Trucks and Bodies, "Costs of Sales" from Cost Column of Sales Book and Credit 15-100 at the close of Each Month.

Dr. 15-101 Second Hand Trucks and Bodies from Purchase Register.

Dr. 15-101 "A" Second Hand Trucks and Bodies, "Cost of Sales" from Cost Column of Sales Book and Credit 15-101 at the Close of Each Month.

Dr. 15-102 Second Hand Improvements from Purchase Register.

Dr. 15-102 "A" Second Hand Improvements, "Cost of Sales" from Cost Column of the Sales Book and Credit 15-102 at the Close of Each Month.

Dr. 15-103 Miscellaneous Cars from Purchase Register.

Dr. 15-103 "A" Miscellaneous Cars, "Cost of Sales" from Cost Column of the Sales Book, and Credit 15-103 at the Close of Each Month.

Dr. 15-104 Parts, Supplies and Repairs from Purchase Register.

Dr. 15-104 "A" Parts, Supplies and Repairs, "Cost of Sales" from Cost Column of Sales Book and Credit 15-104 at the Close of Each Month.

Dr. 15-105 Gasoline, Oil and Grease from Purchase Register.

Dr. 15-105 "A" Gasoline, Oil and Grease, "Cost of Sales" from Cost Column of Sales Book and Credit 15-105 at the Close of Each Month.

Dr. 15-106 Shop Raw Material from Purchase Register.

Dr. 15-106 "A" Shop Raw Material, "Cost of Sales" from Cost Column of Sales Book and Credit 15-106 at the Close of Each Month.

Sub-Controls, Classification of Trade Account Controlled by 30

Cr. 30-120 New Trucks and Bodies from Sales Book. (See 15-100 A for Cost of Sales).

Cr. 30-121 Second Hand Trucks and Bodies from Sales Book. (See 15-101 A for Cost of Sales).

Cr. 30-122 Second Hand Improvements from Sales Book. (See 15-102 A for Cost of Sales).

Cr. 30-123 Miscellaneous Cars from Sales Book. (See 15-103 A for Cost of Sales).

Cr. 30-124 Parts, Supplies and Repairs from Sales Book. (See 15-104 A for Cost of Sales).

Cr. 30-125 Gasoline, Oil and Grease from Sales Book. (See 15-105 A for Cost of Sales).

Cr. 30-126 Shop Material and Labor from Sales Book. (See 15-106 A for Material Cost and G 1 for Shop Labor Cost).

Sub-Control Classification of Incomes Controlled by 30.

Cr. 30-140 Interest on Notes Receivable.

Cr. 30-141 Discounts on Purchases.

Cr. 30-142 Interest on Bank Balances.

NAME <u>John Matthew</u>		1000 Order No.	
ADDRESS <u>190 Broadway, New York City</u>			
SHIP VIA <input checked="" type="checkbox"/> V			
Exhibit <u>120</u>	<u>77</u>	<u>77-260</u>	<u>1120</u> <input checked="" type="checkbox"/> V
Body Tag No.	Model	Chas. No.	Tag No. N. SH 70/30 R.E.T. Cons't
Sold By <u>R.A. Potter</u>	Outside Comm. To	Date of Order <u>10/5/1916</u>	Date Del'd <u>10/6/1916</u>
Make <u>Garford</u>	Chassis Color <u>Red</u>	Terms	
Capacity <u>142 W. B.</u>	Body Color <u>Red</u>	Deposit \$ <u>700</u>	Chassis \$ <u>34.00</u>
Body <u>Express</u>	Chassis Stripe <u>Black</u>	C.O.D. \$ <u>800</u>	Freight \$ <u>40</u>
" Style <u>Open</u>	Body Stripe <u>Black</u>	Ins. Notes \$	Body \$ <u>250</u>
Make of Tires <u>FS</u>		Reg. Notes \$ <u>2350</u>	Freight \$ <u>10</u>
Size Front <u>4x42</u>		Total \$ <u>3850</u>	Extras \$
" Rear <u>4x46</u>		Disc't % \$	Insurance \$ <u>150</u>
Ignition <u>Bosch</u>		Trade Allow \$	Extra Tires \$
		Net \$ <u>3850</u>	Boxing \$
			Job No. \$
			Total \$ <u>3850</u>
Ent. by <u>S.C.P.</u> Remarks and Trade - Reverse side			
Tagged by <u>B.A.D.</u>			
Chg. by <u>S.C.P.</u>			
Settlement No.			

MAKE A NEW CARD IMMEDIATELY			
TRADE: <input checked="" type="checkbox"/>	Model <input checked="" type="checkbox"/>	Year <input checked="" type="checkbox"/>	Allow \$
Chassis No.	Style Body		
Condition Mechanically			
" Chassis			
" Body			
70/30 G. M. T. Co. R. E. T. Corp.			
Remarks:-			

Purchaser's or Customer's Card

On the left is the front of the card, which gives in detail all data relating to the model ordered; also terms of the sale, etc. On the right is shown the back of the card. In the event a truck is taken as part payment, a new card is made out (second hand) giving complete details, including truck's condition, cost, etc.

The CHILTON ideal—honest circulation; results to advertisers—fully exemplified in the CCJ

The practical accounting system is one that permits of recording the daily transactions in such a manner that quick and accurate results may be obtained. It is important to have instantly available statements for the banks and rating companies, and that these should be obtained with the minimum of labor and time. Such statements should be right up to the minute and accurate. The trial balance of the Wilson system is one of its many interesting features.

By first reviewing the controlling accounts it will be noted that the three number 30 controls can be combined into one when a trial balance is taken. The title for

verging the three accounts referred to into one should be "Trading Account Current Profits and Losses." The "trading account number 30 control" shows gross current profits. "Income account number 30 control" shows gross current profits, and "expense account number 30" shows gross current losses. The combining of trading and income accounts will give total gross profits; deducting expenses will give the "Trading Account Current Profits and Losses." The classifications and sub-controls are presented for review in the accompanying six plates, and all references will be by plate numbers to control or sub-control numbers.

Trial Balance

A sample trial balance is shown by Plate No. 7 and it shows how it becomes a financial statement. The data is taken direct from the controlling ledger, a sample of which is shown with supporting figures. By referring to Plate No. 1 it will be noted that all of the asset and debit controls accounts are included. Plate No. 2 gives all of the liabilities and credit controls accounts. To show a financial statement to the banks or rating concerns it is only necessary to present that part of the trial balance containing the financial statements which show in the debit and credit footings, totaling \$418,220. If a detailed trial balance be desired as for the informa-

PLATE No. 1

Assets and Debit Control

1	Cash on Hand
2	Cash in Banks
3	Office Furniture and Fixtures
4	Garage Tools and Fixtures
5	Notes Receivable
6	Accounts Receivable
7	Deposits with Manufacturers and Bids
8	Contracts and Rights
8	'A' Patents, Trade-Marks and Copyrights
9	Treasury Stock
10	Branch Houses
	'A' Boston
	'B' Newark
	'C' Brooklyn
	'D' Mineola
11	Prepaid Insurance, Rents, Etc.
12	Buildings, Real Estate, Leaseholds, Etc.
13	Reserve Fund for Notes Receivable
14	Inventories Under Schedule
	'A' Service Cars
	'B' Salesmen's Cars
	'C' Officers' Cars
	'D' Demonstrators
15	Purchased Stock (Dr. Sub-Controls 100 to 106, Inclusive)
30	Expenses—
	Dr. Sub-Controls 'A'—Administration 1—25
	Dr. Sub-Controls 'S'—Selling 1—25
	Dr. Sub-Controls 'G'—Garage 1—25

PLATE No. 2

Liabilities and Credit Controls

16	Capital Stock—
	'A'—Common Stock
	'B'—Preferred Stock
17	Notes Receivable
18	Accounts Payable
19	Script Dividends
20	Dividends
21	Deposits from Dealers and Customers
22	Surplus (Past Fiscal Period)
23	Officers' Accounts—
	'A'—President's
	'B'—Treasurer's
24	Contingent Liabilities, Under Schedules A, B, C, Etc.
25	New York. Used by Branch Houses Only—
	'A'—Boston
	'B'—Newark
	'C'—Brooklyn
	'D'—Mineola
26	
27	Garford Motor Truck Co.—
	'A'—Settlements
	'B'—Parts and Repairs
28	Garford Motor Truck Co. "Special Account"
29	Past Period Adjustments ("P. & L.")
30	Trading Accounts—
	Cr. Sub-Controls 120—126 Sales
	Dr. Sub-Controls 120-A—126-A—Cost of Sales
30	Income Accounts—
	Cr. Sub-Controls 140—142

PLATE No. 7

Sample Trial Balance—Becomes a Financial Statement

1	Cash on Hand	\$1,050.00
2	Cash in Banks	41,210.00
3	Office Fixtures and Furniture	5,000.00
4	Garage Tools and Fixtures	16,500.00
5	Notes Receivable	12,000.00
6	Accounts Receivable	28,500.00
7	Deposits with Manufacturers	3,000.00
8	Contracts and Rights	60,000.00
	8-A Patents, Etc.	5,000.00
9	Treasury Stock	85,000.00
10	Branch Houses	13,500.00
11	Prepaid Insurance, Rents	
12	Buildings, Leaseholds	25,000.00
13	Reserve for Notes Receivable	4,000.00
14	Inventories, Spec.	18,500.00
15	Purchased Stock	99,960.00
		<hr/>
		\$418,220.00
		<hr/>
		\$418,220.00
30	*Expenses	21,230.00
	Totals	<hr/>
		\$439,450.00

†The Totals of \$418,220.00 Show a Bank Statement.

†The Totals of \$439,450.00 Show a Detailed Trial Balance.

16	Capital Stock	\$250,000.00
17	Notes Payable	5,000.00
18	Accounts Payable	10,100.00
19	Script Dividends	
20	Dividends	10,000.00
21	Deposits from Dealers	18,950.00
22	Surplus P. P.	36,400.00
23	Officers "Private"	25,000.00
24	Contingent	
25	New York for Branches	
26		
27	Garford Set. A/c	15,150.00
	Garford Parts A/c A	5,000.00
28		
29	Past Period Adjustments	1,500.00
		<hr/>
		\$377,100.00
	Trading Account	\$54,000.00
	Income Account	8,350.00
		<hr/>
	Gross Profits	\$62,350.00
	Expenses	21,230.00
		<hr/>
	Net Profits or Trading A/c Current P. L.	\$41,120.00
		<hr/>
		† \$41,120.00
		<hr/>
		† \$418,220.00
		<hr/>
	*30 Trading Gross Profits	54,000.00
	*30 Income Gross Profits	8,350.00
		<hr/>
	Totals	<hr/>
		† \$439,450.00

Everybody who is anybody in the truck industry reads the CCJ

tion of the officers or directors of the company, then expense account number 30 is treated as a debit; accounts number 30, trading and income, as credits. The result obtained will be \$439,450 for totals debits and credits.

PLATE No. 3

Classification of Purchased Stock. Con-
trolled by Account No. 15
Entered as Debits Only.

- 100 New Trucks and Bodies
- 101 Second Hand Trucks and Bodies
- 102 Second Hand Improvements
- 103 Miscellaneous Cars
- 104 Parts, Supplies and Repairs
- 105 Gasoline, Oil and Grease
- 106 Shop Raw Materials (Use 104 Account Preferably)

PLATE No. 4

Classification of Trading Accounts. Con-
trolled by Account No. 30
Entered as Credits Only.

- 120 New Trucks and Bodies
- 121 Second Hand Trucks and Bodies
- 122 Second Hand Improvements
- 123 Miscellaneous Cars
- 124 Parts, Supplies and Repairs
- 125 Gasoline, Oil and Grease
- 126 Shop Labor

Classification of Income Accounts. Con-
trolled by Account No. 30
Entered as Credits Only.

- 140 Interest on Notes Receivable
- 141 Discounts on Purchases
- 142 Interest on Bank Balances

Account number 20 will show the banks the unpaid dividends. Account number 22 the banks the surplus for past periods, while account number 30, "Trading Account Current Profits and Losses," will show the profits and losses from the last fiscal period

up to date. All other items of particular interest to banks and rating companies are quickly and easily obtainable from the details shown in the statement presented in Plate No. 7.

Visible Index System

The visible index or card system used in connection with the Wilson accounting system is one of the most valuable as well as practical features. It could be well called the constant reference index, for it is in constant use and referred to by all of the employees and officers, the repair shop workmen excepted. The cards used are 6 x 4 in. and are attached to a sheet of alumi-

customer's order, a green for service trucks and a pink for officers' cars.

When a new truck is received from the factory a stock or blue card is filled in giving complete details, these including style, body tag number assigned, model, chassis number, and tag number assigned, etc. Space is provided for filling in the make, capacity, wheelbase, body, style, make of tires, size front and rear, ignition, chassis color, body color, chassis stripe and body stripe. Another column is used for filling in the cost of chassis and freight, body, freight on body, extras, insurance, extra tires, boxing, etc., and all other items of

PLATE No. 5

Classification of Costing Sales. Controlled by Accounts Nos. 15 and 30

Entered as Debits and Credits from Cost Column of Combination Sales and Cost Register

Dr. 30—120 A	New Trucks and Bodies	Cr. 15—100
Dr. 30—121 A	Second Hand Trucks and Bodies	Cr. 15—101
Dr. 30—122 A	Second Hand Improvements	Cr. 15—102
Dr. 30—123 A	Miscellaneous Cars	Cr. 15—103
Dr. 30—124 A	Parts, Supplies and Repairs	Cr. 15—104
Dr. 30—125 A	Gasoline, Oil and Grease	Cr. 15—105
Dr. 30—126 A	Shop Labor	Cr. 30—G 1

num 7 x 21 in. wire bound vertical frame by a patented process of cutting lips in the cards. The sheets are attached to a stand that permits of revolving the frames. These sheets may be removed and replaced when desired. The stand has a capacity for a large number of sheets. In the Wilson system but seven regular cards are used for keeping track of the trucks and cars, and each has an individual space on the sheets, color and title. A blue card is used for new stock, a tan for bodies, a chocolate or russet for consigned trucks, a yellow for second-hand trucks, a white for purchaser or

expense incurred with the new truck. This data is important. In the first place the exact cost of a new truck, extras, etc., is instantly available. The blue or new stock cards occupy a sheet by themselves and each has a serial number. If a salesman has a prospect desiring a certain capacity chassis, body, etc., and of a certain color, the stock sheet will show all trucks of this model in stock and their costs. The back of the card—both sides are utilized—shows the equipment received with the truck, the date and who checked. A physical inventory is taken monthly and date entered on

Express 120		77		77-260		1120		1000	
Body	Tag No.	Model	Chassis No.	Tag No.	Order No.				
DELIVER TO John Matthew									
ADDRESS 190 Broadway, New York City									
SHIP VIA									
Sold By		Outside Comm. To		Date of Order		Date Del'd		Date Cancelled	
R.A. Potter		✓		10/5/1916		10/6/1916			
Make Garford		Chassis Color Red		Cost		Sale			
Capacity 142 W. B.		Body Color Red		Chassis \$ EPLY		Chassis \$ 3400			
Body Express		Chassis Stripe Black		Freight \$ 15		Freight \$ 40			
" Style Open		Body Stripe Black		Body \$ ELX		Body \$ 250			
Make of Tires F.S.				Freight \$ DX		Freight \$ 10			
Size Front 4 x 4 1/2				Extra \$ DLX		Extra \$			
" Rear 4 x 6				Insurance \$		Insurance \$ 150			
Ignition Bosch				Extra Tires \$		Extra Tires \$			
				Boxing \$		Boxing \$			
				Job No. \$		Job No. \$			
				Total \$		Total \$ 3850			
Tagged by B.A.D.		S.H.—Rec'd From		Order No.					
Checked by S.C.P.									

Front and Back of the New Stock Card

The upper view shows the front of the stock card filled in with details of the order, costs, terms of sale, etc. Note the patented lip at the bottom for holding card on aluminum frame mentioned in text. On the right is shown the rear of the card, on which the equipment received with the new truck is checked and the date is also filled in and who checked by.

CHECK THE EQUIPMENT WHEN TRUCK OR CAR IS RECEIVED INTO STOCK.		INVENTORY Date Rec'd Oct 1-1916 Check Monthly Until Sold.	
TRUCK EQUIPMENT	DATE	CHECKED BY	
Head Lamps	✓	10-1-16	B.A.D.
Tail Lamps	✓		
Search Light Bkt.	✓		
Prest-O-Lite Tank	✓		
Wind Shield	✓		
Tool Box	✓		
Complete Set Tools	✓		
Lock & Key	✓		
Jack	✓		
Odometer	✓		
All Curtains	✓		
Seat Cushions	✓		
Dry Cells	✓		
Magneto Bosch	✓		
Coil	✓		
Horn	✓		
CHECKED BY			

the back. This prevents taking any part of the equipment from one truck and using it for another unless a record is made and indexed.

We will assume that a salesman has sold John Matthew Model 77 truck, or has taken an order for same. The contract is made out (the form will be shown in logical sequence) and the sheet containing the new stock cards is looked through and found to contain the truck desired. An order tickler

and the order ticklers are arranged in consecutive order numbers. As stock and order cards remain together and are always in sight, there is no possibility of the order being overlooked. The method serves as a constant reminder of the order and affords opportunities to investigate delays. A delivery order can thus be easily traced.

Assuming that in the case of John Matthew he traded in a truck for the Model 77. The particulars of the new car, terms,

Another salesman reported that Mr. X wanted to trade in his Model 80 for a larger car, and what did the Model 80 cost the company, etc., under what conditions was it sold, and did he pay cash or take time? This data was quickly afforded by the index system.

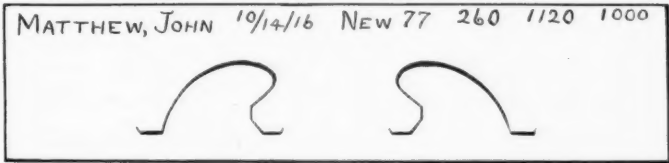
It should be explained that in connection with the blue and white cards that these are held until a number is assigned to the truck ready for delivery or to be placed in stock. The blank order cards are numbered consecutively, say starting with 1000 for example. The customer's card is kept in the sheet until the stock card with its number is taken out, and neither is removed until the delivery is made when the cards are filed under the name of delivered cars in the index. Orders filled are filed alphabetically so that delays are avoided when information relating to sold cars is desired. Record is instantly available of trade-ins or those coming in, and data of all retail orders, selling prices and terms of the branch stores is recorded on the cards in the same manner. The same method is used for keeping record of consigned trucks, bodies and officers' cars.

Very frequently a traded-in truck is sent to the repair shop after an appraisal has been made, and it may be that considerable work is done as well as a number of old parts replaced with new. It is important that the costs of this work should be available, or in other words, the system would not be practical if some means were not included for obtaining the figures and compiling the costs within a reasonable length of time. With the Wilson system this data can be supplied immediately, but as an explanation of the method relates to the repair shop forms, etc., it will be given in the next installment.

(Concluded in our next issue)

The Order Tickler

This card remains with stock and order cards until delivery is made, avoiding possibility of order being overlooked.



is next made out. This is a white card 6 x 1 1/2 in., and on this is marked the customer's name, date, model number, chassis number, tag number and order number. The last named is a serial number as previously explained. The white or customer's card is then filled in, giving name and address, shipping instructions, order number, dates, salesman's name and other details, these being shown by an accompanying illustration. Such data is taken from the contract and includes details of the sale. It is, in fact, a replica of the new stock card with terms, etc., added.

The blue or stock card is now detached from the stock sheet and filed in the sheet for customers' or the white card. If a special body or equipment be ordered, the cards remain in the frame until the delivery is made. After delivery the cards are filed in another sheet for future reference.

The order and stock cards are filed alphabetically and by model respectively,

etc., are filled in on the customer's order card, and the data on the back will include the allowance made for the old machine. The traded-in car is a second-hand, and the yellow card for that purpose is next filled out. The data includes the name, model, year, allowance, chassis number, style of body, condition, mechanically of chassis, body, etc. This card is filed in the index sheet under second-hand cars, and as complete details are given as to the truck in question as well as relating to the new truck, any information is instantly available. Different makes are separated, saving time when information is required. The writer had several opportunities of noting the value of the system. At one time the president of the company desired to know what was in stock for a prospect desiring a second-hand 5-ton truck with a dumping body and the condition of the car. In less than a minute complete details were supplied of three different makes, and the information included costs, etc.

PLATE No. 6

Classification of Expenses Controlled by Account No. 30

Entered as Debits Only.

1	Salary and Labor	1	1
2	Commission	x	2
3	Heat, Light and Power	x	3
4	Rent and Warehouses	x	4
5	Postage	x	5
6	Telephone and Telegraph	6	6
7	Printing and Stationery	7	7
8	Employees—Traveling and Entertaining.....	x	8
9	Express and Freight—Miscellaneous.....	x	9
10	Freight on Automobiles	x	10
11	Interest, Discount & Exchange (Paid Out)...	x	11
11	'A'—Stock Discounts & Premiums.....	x	11
12	Taxes, Insurance and Licenses	x	12
13	Advertising—Shows, General	x	13
13	'A'—House Organ	x	13
14	Service Cars, Upkeep and Repairs.....	14	14
15	Depreciation and Worthless Accounts.....	x	15
16	Petty Expenses	16	16
17	Legal Advice, Collections, etc.	x	17
18	President's Traveling and Entertaining	18	x
19	Car Fare	19	19
20	Policy Adjustments	x	20
21	Salesmen, Prize and Bonus	x	21
22	Delivery Charges and Demonstrations.....	x	22
23	Salesmen, Drawing A/c Liquidated.....	x	23
24	Policy Guaranteed (Outside Commissions).	x	24
25	Special Policy	x	25
	Grand Totals		

x Indicates no charge to department.

A. C. HILLS, of the English Daimler Co., who recently visited this country, stated that the famous tanks are engined with Daimler power plants, and are about 60 ft. long. Their weight is sufficient to push down a 6-in. tree trunk when driven direct at the tree. The report that the tanks are composite vehicles made in different factories is thus confirmed. Mr. Hills has been prominent in the British motor industry for many years.

THE LONG DISTANCE POSSIBILITIES of trucks are recognized by the manufacturers and dealers, as shown by overland deliveries of trucks by various makers. For instance, on the afternoon of October 12, 22 of the new 1500-lb. Republic No. 9 trucks started from the Republic Motor Truck Co.'s factory at Alma, Mich., for Detroit. The run covered a distance of 150 miles, the trucks being delivered to Towar-Ayers Co., the recently appointed Republic dealers in Detroit. Such trips from the Republic factory are not uncommon and save delay to the dealer. Incidentally the Detroit dealers have disposed of a truck a day since taking on the Republic, and say that the field in Detroit for truck sales is very bright.

Merit wins—that's why the CCJ is the leader

How New York Compiles Traffic Statistics

By GEORGE W. GRUPP

THE trade, undoubtedly, was very much interested in the traffic statistics of New York City which were recently compiled by H. C. Hutchins, the assistant engineer of the Manhattan Public Works Department. They were not only interesting but valuable to both local dealer and the Public Works Department. They are particularly valuable to the city because it must keep an ever watchful eye on its traffic, so as to be able to make new traffic regulations, widen the streets, etc.

Every city should keep its eye on its vehicular traffic if it hopes to be classified with the progressive. But how to go about it, and how to get an estimate of the tonnage—that is the real question. Mr. Hutchins found a solution to this problem. He very carefully thought out a rather clever scheme. The result was three forms. They accompany this article.

With a good supply of these forms he sent out a large corps of men to take the census. Sometimes four census recorders, this depending on the amount of traffic which took place in the block, were stationed in a single block in order that each might act as a check on the other. Each recorder was equipped with a supply of Form "A." On the top of the card he noted the weather conditions and the temperature as this is a very important factor in determining the amount of traffic in a

given street. Also, the location, whether north, south, east or west bound, and the side of the street the recorder was observing was carefully noted on the card. Then, under the time column, a separate census is begun every fifteen minutes. Across the card, opposite the time, he would note

what passed by him. If an empty 1500-lb. truck passed him he would make a little mark under the column labeled "Small Auto Trucks E. 0.75."

The key to such symbols as "E. 0.75" is as follows: "E" stands for empty; "½ L." for one-half load, and "L." for load.

BOROUGH OF MANHATTAN TRAFFIC COUNTS.									
Location.....		between.....		Sheet No.....					
Date.....		Hours taken.....		Weather.....					
Temperature.....									
Kind of Vehicle		Bound		Bound		Total		Maximum Time	
		Number	Tonnage	Number	Tonnage	Number	Tonnage	Number	
Horse Drawn Iron Tire									
" Rubber Tire									
Automobiles									
Street Cars									
Auto-Trucks									
Auto-Busses									
Total									
Width of Roadway between Curbs				Width of Sidewalks		Side			
Pedestrian Traffic		Max-No.	Time	Total No	Legal	Side			
Side Bound					Width of Sidewalks	Side			
Side Bound					Actual	Side			
Side Total					Pavement	Grade			
Side Bound					Max.No. of Vehicles per ft. of Width per Min.				
Side Total					Max.No. Pedestrians per ft. of Width per Min.				
					Side	Side			

Traffic Index Card, Form C

This card serves as an index and gives a brief history of the results of the investigations, Form B being too large and elaborate to make duplicate copies of for all offices affected and interested

WEATHER.....		TEMPERATURE.....		TRAFFIC		BOUND PEDESTRIAN AND VEHICULAR		Date.....	
		AND		TRAFFIC ON		AND			
		BETWEEN		AND					
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
		9:00-9:15	9:15-9:30	9:30-9:45	9:45-10:00	10:00-10:15	10:15-10:30	10:30-10:45	10:45-11:00
		11:00-11:15	11:15-11:30	11:30-11:45	11:45-12:00	12:00-12:15	12:15-12:30	12:30-12:45	12:45-1:00
		1:00-1:15	1:15-1:30	1:30-1:45	1:45-2:00	2:00-2:15	2:15-2:30	2:30-2:45	2:45-3:00
		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15	6:15-6:30	6:30-6:45	6:45-7:00
		7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
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		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
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		3:00-3:15	3:15-3:30	3:30-3:45	3:45-4:00	4:00-4:15	4:15-4:30	4:30-4:45	4:45-5:00
		5:00-5:15	5:15-5:30	5:30-5:45	5:45-6:00	6:00-6:15			

Further the figures underneath these symbols stand for the estimated tonnage. For example, 1.00 stands for one ton, and 1.75 for one and three-quarter tons. It would be impossible to ask each driver to stop his truck and then weigh his load and

has been exceeded, immediately plans are set on foot to remedy the congestion.

These charts, Form "B," which are 14 x 26 in., are too large and elaborate to make duplicate copies of for all the municipal offices which are affected and interested in

ARRANGING THE TRUCK DEALER'S SHOW WINDOW

What is there about show windows that makes some of them mere commonplaces? What is there about some stores which make people want to go to them? Why do some people tell others that they should not fail to visit Doe & Co.'s store? Why do people stop at Smith Bros.' show window and never think of looking at John Slow's window? Why do most people prefer looking at an automobile or motor truck which is covered with mud from end to end, rather than one which is shown in its brightest colors?

For all of the foregoing questions there is but one answer. Their displays have been inviting and attractive. These dealers, it is self-evident, try every possible means of making their wares arouse the sense of curiosity of the passerby. Their displays have a pleasing effect on the people. By demonstration, they show how their wares may be, or are being, successfully used. By being particular, their wares always have the right background in order that the article shown may be properly displayed.

This then leads one to the question of the motor truck. What is there particularly attractive about seeing a new model of a motor truck in all of its finest feathers? Nothing, except if one happens to be actively engaged in the trade or in the market to buy a truck. Again a motor truck show which merely displays the new models is apt to prove to be tiring to the eye.

Make the Show Attractive

But how to make a motor truck show so attractive and pleasing so as to set the whole town a-talking is the big question. In the first place it will never be accomplished if the show is a mere exhibition of different models. Something besides mere trucks must be shown. The truck should be shown with auxiliary devices. Small models should be shown, so that the public might see how demountable bodies increase the efficiency of the truck which is engaged in a department store, or the like, business. Model auxiliaries should be shown which will demonstrate to the public how a truck can do more work with such appliances. Models which picture the saving of space in stables, congested streets, etc., when motor trucks are used, make an interesting exhibit. In other words, models of all kinds which show the prospective buyer or horse user what a motor truck can and is doing should not be lacking. And near these models display cards should be placed on which the results and cost figures are tabulated. All of this would help very materially to popularize the show.

A truck show such as suggested would be something new and out of the ordinary. Such an exhibition would attract a very much larger number of persons and more fruitful would be the results. From it people would get a better conception of the truck idea, and worth their while going to see.

VEHICLE TRAFFIC OBSERVATIONS Borough of Manhattan. Date: _____																			
Weather _____		Location _____		Bound _____		Side _____		Observer _____											
Temperature _____										ONE HORSE		TWO HORSE		THREE HORSE		FOUR HORSE		TOTAL	
E I L L L		E I L L L		E I L L L		E I L L L		E I L L L		E I L L L		E I L L L		E I L L L		E I L L L		E I L L L	
IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE		IRON TIRE	
1.00	1.75	2.50	3.25	4.00	4.75	5.50	6.25	7.00	7.75	8.50	9.25	10.00	10.75	11.50	12.25	13.00	13.75	14.50	15.25
1.00	1.75	2.50	3.25	4.00	4.75	5.50	6.25	7.00	7.75	8.50	9.25	10.00	10.75	11.50	12.25	13.00	13.75	14.50	15.25

Vehicle Traffic. Form A

The traffic records are sent out with these forms to carefully check all traffic

truck. Therefore it is estimated by the size of the vehicle and the amount of goods in it.

At the end of the day the census takers turn in these cards to the statistical compilers who summarize the results on a big chart, Form "B," which are in turn handed to the city's traffic experts and engineers. And if they find that the maximum number of vehicles per foot of width per minute

the results. Therefore for their purposes Mr. Hutchins got up a sort of card index. This card not only serves as an index but it also gives a brief history of the results of the investigation. See Form "C."

This system of Mr. Hutchins' the writer believes should be of great value to motor truck dealers or municipalities who wish to take a similar census in their city. In a sentence, the system is very practical.



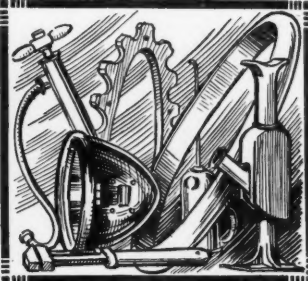
Sterling Three and a Half Ton Truck Carrying Motor "Squeegee" Apparatus

Modern methods are employed in the city of Milwaukee in cleaning its miles of asphalt pavement in the residence districts. Two machines are used, the first of which was purchased in July, 1915, and the second in April of this year. Both are mounted on three and a half ton Sterling chassis and have a capacity of nine hundred gallons of water. In front are two sprinkler heads and a brush, which are not used all the time but brought into action only when there is some material stuck to the pavement. The rubber "squeegee" lies across the chassis about midway between the axles, and is brought into contact with the road by a lever in the driver's cab similar to the emergency brake lever. The different water supplies are controlled by levers on top of the tank which extend into the cab over the driver's shoulder. These cleaners each make from twenty-five to thirty miles a day and wash between 85,000 and 105,000 sq. yds. of pavement.

Make your product pay—advertise in the CCJ



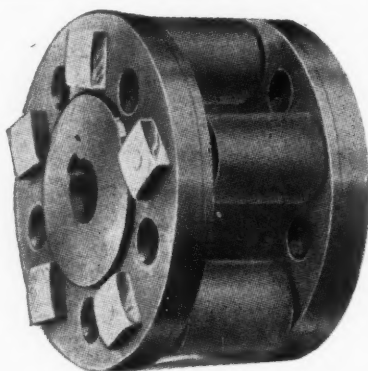
TRUCK ACCESSORIES AND APPLIANCES



THE TRACFORD

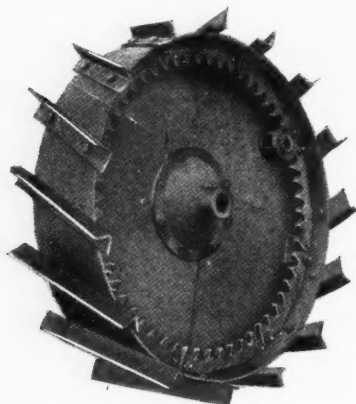
The Standard-Detroit Tractor Co., 1506 Fort Street, W., Detroit, Mich., is manufacturing the Tracford which is described as being an attachment for converting the Model T Ford car into an economical light tractor. The rear wheels, fenders, rear spring and rear running board hangers of the Ford are removed and a single half-inch hole bored in the Ford frame on each side about half way of its length. A hardened steel roller pinion replaces the regular Ford wheel. This roller pinion engages an internal gear on the inside of the Tracford wheel rim. The result is a 9:1 reduction. A circulating pump is furnished which replaces the straight water pipe on the left side of the engine. By the use of

this pump circulation starts with the engine, instead of waiting for the water to get hot. The frame of the Tracford is constructed of 4 in. channel iron. The wheels are steel discs and run on a 2 in. solid steel dead axle, which carries the entire weight of the Ford, and to which the Ford frame is bolted. The wheels have a 10 in. face,



The Steel Roller Pinion

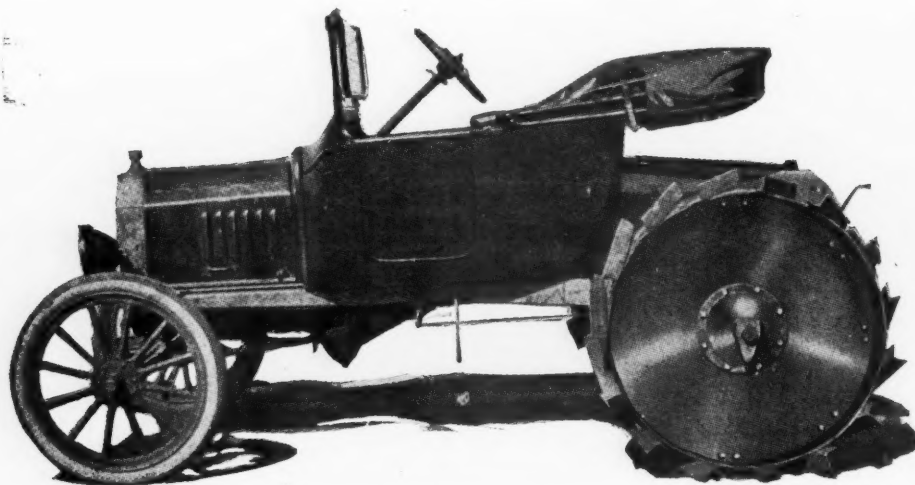
This roller pinion engages an internal gear on the inside of the Tracford wheel rim



Tracford Steel Wheel

The wheels are steel discs with a 10 in. face. The above illustration shows the internal gear, which is constructed in eight sections of seven teeth each.

equipped with angle iron lugs for field work, and are fitted with an oil reservoir holding nearly a quart of heavy oil, which thoroughly lubricates wheel, bearing and axle. The maker states that there is no increased load on the Ford engine or transmission gears, as the Ford does all its pulling on high gear. The tremendous increase in pulling power is obtained by the roller pinion engaging the internal gear, thus transferring all the strain to the attachment. The price of the Tracford is \$125.



The Tracford

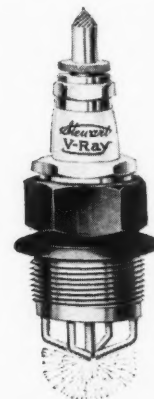
This machine is designed for all sorts of farm work, which includes drawing spring-tooth harrows, rollers, mowing machines, binders, corn harvesters, potato diggers and plows

For its readers—information; for its advertisers—results. That's the purpose of the CCJ

STEWART V-RAY SPARK PLUG

The Stewart-Warner Speedometer Corp., Chicago, Ill., is manufacturing the Stewart V-Ray 4-point Spark Plug. More power, less gas consumption, and greater engine flexibility at any speed are claimed to result from the use of this plug. The four points are said to give a steady, continuous and unusually hot spark. Should the point on which the plug is firing become fouled, the spark is immediately transferred to another point. The sparking points are extended far below the body of the plug, so they reach down into the explosion chamber. This aids combustion and removes the likelihood of a misfire.

The porcelain core is of Petrifint, which is made by a special process. This material is a hard, close-grained insulating medium



The Stewart V-Ray Spark Plug

A universal terminal which fits practically every cable terminal in use is part of the V-Ray. An important feature of this terminal is that it embodies a convenient means for cleaning the four sparking points. This is accomplished by slipping the tapered end of the terminal on the center point and turning with a slight pressure. The rasp-like surface scrapes the points, leaving them clean and ready for service.

which will not absorb oil and is nearly fracture-proof. Between the porcelain core and the spark plug body are two copper asbestos gaskets. The center sparking point, which goes down through the porcelain core, is also packed with an asbestos gasket. The best nickel-steel wire is used for the sparking points, which are claimed to resist the great heat action and give long service without burning or corroding. Price of the V-Ray plug is \$1.

TRUCK MANUFACTURE IS RAPIDLY increasing, a recent record shipment from the Republic Motor Truck Co., Alma, Mich., being 80 trucks.

THE ENSIGN CARBURETOR

In the design and development of the Ensign carburetor it was recognized that the problem was one of hydraulic engineering. In other words, a carburetor is a device for regulating the flow of fluids under varying pressures. This carburetor was designed with these facts in mind, that all fluids, whether liquids or gases, that are without high viscosity follow the same law with regard to the relation between velocity and pressure, namely — $v = \sqrt{2gh}$. Therefore, if a drop in pressure is created by a stream of flowing air, gasoline, kerosene or water will flow into the low pressure zone created by such air velocity in exact proportion to the weight of air passing through the carburetor, provided there is no friction or sudden changes of direction between the entrance to the carburetor and the point where the fuel is affected by the air flow.

In this carburetor a graduated bell mouth is used for the air inlet horn, giving gradual acceleration to the air up to the point of the highest velocity. The air enters the mixing chamber, tangent to the circular walls of the chamber forming by way of illustration, a structure similar to the volute of the centrifugal pump, except that it is circular instead of scroll shaped. The air entering in this manner forms a helical rotating current around the center of this structure, and the drop of pressure in the center of the vortex thus produced is proportional to the square of the rim velocity following the same principle as the impeller of a centrifugal pump. Fuel is introduced into this mixing chamber at the top through a submerged orifice, and flows over the edge and down a standpipe or suction tube, communicating with the center of the vortex chamber. The fuel

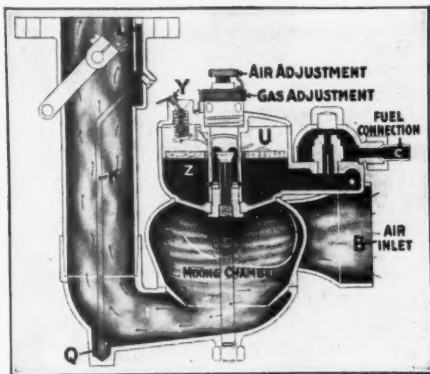


The Ensign Mixing Chamber Volute

orifices are in the wall of a so-called suction chamber, which is effected by the lowered air pressure produced in the center of the vortex. It is thus seen that the Ensign carburetor may be considered a form of centrifugal pump using an air impeller applying suction to the liquid fuel through a restricted orifice. It is easily seen that with this suction chamber closed tight to the external air the suction on the small orifice would be equal to the vortex suction at all times; and from the point where the air enters the inlet horn to where it is applied to this standpipe or suction tube, there is absolutely no friction in the common sense of the word; at least none that tends to increase the vacuum on the fuel, but, on the contrary, to lessen it.

It may readily be seen, therefore, that two methods of adjustment may be applied

and are applied to this construction. One is by changing the area of the fuel orifice; the other is by admitting air to this suction chamber, thereby diminishing the suction on the fuel orifice, and both of these methods are used. The air adjustment is accomplished by the control of the lift of a single definitely weighted air valve which lifts at an engine speed slightly above idling and thus the difference between idling and power mixture is obtained; and by use of the air adjustment a very much closer and finer adjustment can be obtained than can be brought about by the straight fuel adjustment. These are all the adjustments required for any engine. To make it possible to adjust this carburetor to suit the extreme low idling conditions



Cross-Section of Ensign Carburetor

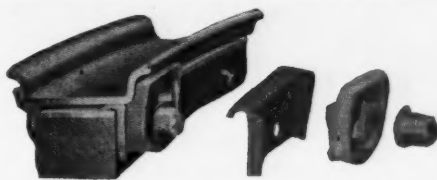
Ensign carburetors are constructed in three different models; for gasoline, for distillates and for heavier fuels.

demanding by the automobile trade, an additional device consisting of an unbalanced butterfly is used, designed to oscillate with change of load only, about a horizontal axis passing through the center of the large diameter of the air intake horn. This butterfly is unbalanced with reference to the weight of its top and bottom halves, as well as the area; it only hangs vertical when the carburetor is not in action. This device requires no adjustment. The slowest air movement causes it to begin to assume other than a vertical position and at cutting the air stream edgewise. It affects miles per hour on the high gear of the automobile, it rests perfectly horizontal, cutting the air stream edgewise. It affects the working mixture only at extreme low speeds and makes possible the richer mixture desired to accomplish extreme low idling, but is claimed not to choke or interfere with the free flow of the air into the carburetor under any conditions of power or speed. This butterfly is provided with a long bearing; it only moves with the movement of the throttle and is subject to no wear.

One of the features of the design is with reference to the fuel orifice. It is a submerged orifice located at least $\frac{3}{4}$ in. below the fuel surface in the float chamber and is a round clear opening, adjusted by closing off a part of this opening shutter-like, leaving a clear open space. Ensign carburetors are priced from \$15 to \$40 according to the requirements. The Ensign Carburetor Co., 149 West Pico Street, Los Angeles, Cal., are the manufacturers.

MCKAY'S NON-DEMOUNTABLE AUTO WHEEL CLIPS

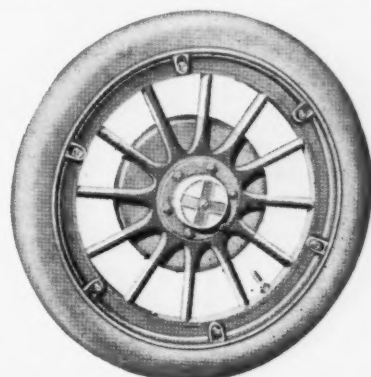
The Standard Welding Co., of Cleveland, Ohio, has entered into a contract with the McKay Co., of the same city, to manufacture rims and felloe bands for them. These rims are known to the trade as the McKay



Sectional View of Type A

Showing the clip holding a straight-side rim on the felloe band. The flange of the nut is in the lower depression in the face of the clip, thereby holding the clip in operative position, and preventing any radial movement such as might release the rim.

special rims, and have the protection of the Baker Patents as well as McKay's. It is the same type of rim as the Standard Welding Co.'s 21 and 22 and will fit their present felloe bands and are interchangeable. The company claims that the McKay Non-Demountable Clips do not infringe the Perlman patent and were invented before the Perlman patent was sustained. The object sought was to produce a clip which did not have a tendency to distort the rim out of round. Wheels and felloes as a rule are made as true in diameter and circumference as it is possible to make them. McKay clips are said to apply no radial stress to the rim at any point, as the pressure exerted is lat-



McKay's Clips Locking Rim on a Wheel

These clips are said to fit any standard bolt, and may be applied to any wheel, as the dimensions are the same as are used for old-style clips. The maker calls attention to the fact that not only is there no tendency to force the rim out of its true shape, but a force is exerted to keep the rim true.

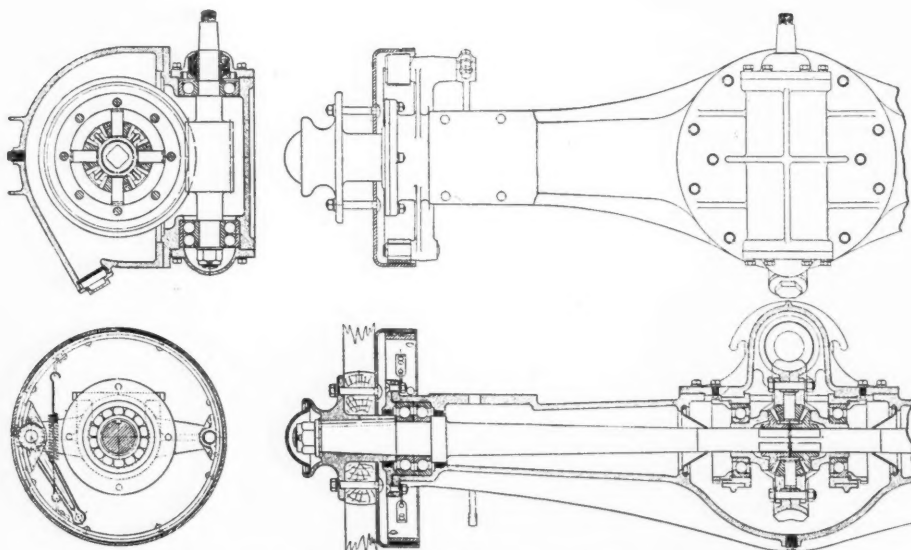
eral, like a vise jaw. These new clips always remain on the wheel, requiring only twelve turns to tighten each clip; saving the time usually required in starting the nuts on the threads of the bolts.

HOLT-WELLS Co., INC., New York City, manufacturer of the Branford and Brown carburetors, recently elected the following officers: E. H. Sickles, president; F. E. Hamilton, vice-president and counsel; Calvert Holt, treasurer; Paul Welles, secretary, and Wm. M. Williams, assistant secretary-treasurer. The board of directors is composed of the above officers.

Why is the CCJ the only truck paper a member of the Audit Bureau of Circulations? Here's food for thought

WISCONSIN SEMI-FLOATING WORM AXLE

The Sales & Engineering Corp., 112 N. La Salle St., Chicago, Ill., are selling agents for the 1-ton capacity Wisconsin worm drive axle, manufactured by the E. B. Hayes Machine Co., Oshkosh, Wis. A review of the special feature summary reveals the fact that the housing casting of this axle is made of one-piece and thoroughly reinforced by a box-type rib which is designed to care for all strains and shocks, giving minimum weight and maximum strength throughout. This method of reinforcing obviates the necessity of employing truss rods. Specially designed grease retainers serve to keep the grease from creeping to the axle ends and dripping from the brake drums. The spindle incorporates a special locking device which holds the bearings in place on the driving shaft. This arrangement permits the driving shaft to be easily removed and shafts taken out without the disassembly of the entire axle. The driving shaft is of special alloy heat-treated steel conforming to the following physical requirements: Tensile strength, 150,000 lbs.; elastic limit, 138,000 lbs.; elongation 15 per cent. in 2 in. Axle shafts are forge tapered to eliminate considerable whipping, which increases the life of the shaft. The worm is made of special alloy steel carefully ground. A special alloy bronze wheel gives a maximum of wear with a minimum of friction. Worm and wheel together with the Bailey heavy duty positive two-wheel drive differential, are mounted as a unit on a one-piece casting which forms the cover for the case. Bearings on each side of the differential are mounted in a separate cage and may be easily removed or adjusted. The axle is furnished with single or double brakes, as may be desired, $2\frac{1}{2}$ in. internal expanding on a 14 in. drum and $2\frac{1}{2}$ in. external contracting. Both brakes are lined with Multibestos lining, insuring absolute control at all times. Extremely heavy duty ball bearings are furnished throughout.



Wisconsin Worm-Drive Axle for One-Ton Trucks

Bailey differential, one-piece housing and single or double brakes are specified for this axle. The maker calls attention to the feature on the hub of doing away with hub caps.

THE WALTER AUTOMATIC LOCK DIFFERENTIAL

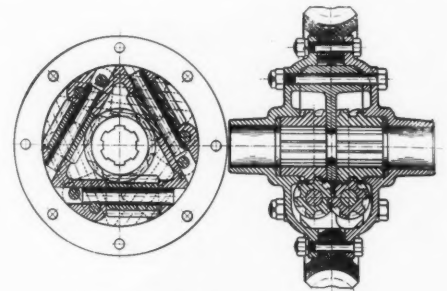
The Walter Automatic Lock Differential is a patented worm gear device operating on an entirely distinctive principle so as to eliminate all differential action, but to retain the correct compensating and equalizing action of the conventional device. This differential does not differentiate because one wheel has greater resistance than the other, but only when one wheel must be driven at a greater speed than its mate.

The distinctive gear arrangement in which the worm gears mesh directly together and separately with the drive shaft worms is claimed to be the simplest and most direct, having a minimum of backlash. The worm gears are all right handed, the worms being of 27 deg. lead angle. The housing construction is of an improved type, the worm gears being mounted in a center piece and bolted to the two halves which form the housing and support the drive shaft worms. This design is entirely interchangeable with the present differentials, no change of worm gears, bearings or shafts being necessary.

In order to understand why this worm gear device has the desired locking action and still retains the correct differential action, it is necessary to understand the fundamental characteristics of self-locking worm gearing on which it is based. With a worm and gear of say 15 deg. lead angle, the worm will easily start and drive the worm gear, but the worm gear cannot start the worm. The greater the pressure the greater the static lock. If the worm is given a start then the worm gear will continue to drive the worm with a high efficiency of about 80 per cent. This action, characteristic only of a worm gear driving a worm of less lead angle, is the fundamental principle why this device has a static lock and a high operating efficiency so as to give equalized as well as compensating differentiation. If a drive wheel leaves

the ground or loses its traction it is not accelerated because the worm gear cannot start the worm on that drive shaft, the device is in a static lock condition. On turning, however, the initial tendency of the outside wheel to rotate faster releases the static lock and the device then drives the outside wheel faster and the inside wheel slower, giving correct differentiation. If the tires are of unequal size the same action takes place.

In actual service it is not necessary to use absolutely self-locking worm gearing because a drive wheel always has some



The Walter Automatic Lock Differential

The above illustration shows a new design for worm-drive trucks. This differential is claimed to compensate the speed of the drive wheels and equalize the torque.

driving resistance, either its traction or its inertia, and this resistance will give the desired locking action with gearing up to about 30 deg. lead angle. This construction can be made with any desired lead angle, but 27 deg. is used because it gives the best result in service. With this angle the worm gearing not only has a very smooth and quiet differential action, but in case of shock the gearing will slip enough so as to divide the shock load between the two shafts, so that stronger drive shafts are unnecessary. It should be noted that if 45 deg. gears be used there can be no static lock action, as the gears drive each other equally well. Adding more gears, so as to make a more indirect train of 45 deg. gears, merely increases the friction and gives a device with a very low operating efficiency and which is really an internal friction device and not the same as a true self-locking device.

These differentials are being made by the Walter Motor Truck Co., 49 W. 66th Street, New York.

SAMUEL L. MOORE & SONS CORP., Front and Franklin Streets, Elizabeth, N. J., has just issued a bulletin No. 103, which describes and illustrates in detail its type F electric industrial truck. The feature of this truck is that it can be easily dismantled, as all mechanical parts are exposed when a hinged platform at the front of the truck is raised, thereby giving immediate access to the motor, controlling, wiring, brake, battery, etc. This feature enables a radical saving in time and labor when any mechanical adjustments are to be made.

THE HADDON VAPORIZER

Our esteemed British contemporary, Motor Traction, gives particulars of a new kerosene vaporizer embodying certain improvements of so radical a nature as to render it materially different from its fore-runners in its principle of operation. This device is known as the Haddon Vaporizer, and is being marketed by John Haddon & Co., Salisbury Square, London, E. C.

The Principle of Vaporization

As vaporization is effected by the exhaust gases of the engine, a gasoline carburetor has to be provided, and this detail has been reduced almost to its simplest elements, and is practically incorporated with the intake pipe close to the throttle. Assuming the engine to be started, the ex-



General View of the Haddon Vaporizing Chamber

haust gases are passed into the vaporizer, which also acts as an efficient silencer. It is described as being a cylindrical chamber, along which, inside, extends an annular space packed with heat accumulating metal bodies. The exhaust is free to circulate through the middle of this space, and around the outside of it, between it and the vaporizer walls, which finally are heavily lagged outside with asbestos to retain the heat.

After the hot exhaust gases, then, have circulated around this annular box, or sleeve, of metal bodies, the latter become heated, and represent a store of heat which will still be available for vaporization even after the engine has stopped some little time. The vaporizer is usually located below the chassis frame, in much the same position as a muffler, and the exhaust is led in at its front end. At the back end the float feed carburetor for the kerosene is located, and this feeds into and along a tube which extends into the vaporizer, and is drilled with a row of small holes through which the kerosene drops on to the hot metal bodies and is vaporized. It is

thus separated into drops, further broken up by the hot rivets, on which it finally spreads in the form of thin film.

It is at this stage that a radical alteration on previous practice is introduced. It has formerly been the rule to mix air with the vapor or gas in the vaporizer. Without going into details it may be said that the principle was abandoned because the temperature of the vapor or gas could not be controlled because of partial combustion of the mixture. Obviously, this is undesirable; the combustion is wanted inside the engine, and for this reason in the Haddon vaporizer the actual process of vaporization is effected in the presence of a small proportion of exhaust gases instead of air. This supply of inert gas involves no care or adjustment by the driver. It is this feature which keeps the temperature of the kerosene vapor down.

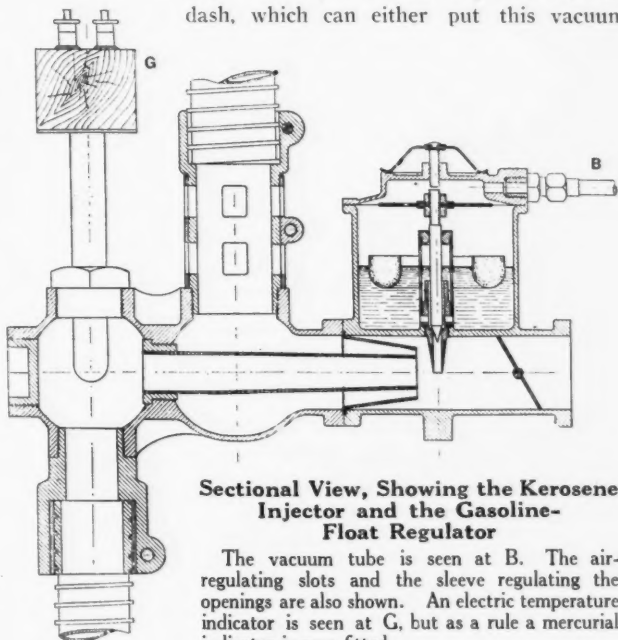
The pipe conveying the gas from the vaporizer is taken past the air intake and projects into the throttle valve chamber. At the end of this gas pipe is a conical Venturi tube. The air supply—which is a fixed quantity—is drawn in through ports, and passing through the Venturi choke tube is mixed with the paraffin gas. In the winter the air ports mentioned may be closed and warm air used for the mixture.

Details of the Vacuum Control

This is sufficient to explain the principle of vaporization. We can now go a little more into detail. Owing to the design of the carburetors, the supply of fuel, whether gasoline or kerosene, is regulated by, and therefore proportionate to, the suction of the engine. This can best be seen in the sectional drawing, showing the gasoline carburetor, in which the top of the float chamber can be seen in connection with a

pipe, which in turn is connected indirectly with the intake pipe, and so with the suction of the engine. It is in effect a partial vacuum tube, and the top of the float chamber is divided from the rest by a flexible diaphragm. When, therefore, the engine is working, there is more or less vacuum in the top of the float chamber, and so the diaphragm is bent upwards, and thus the stop on it clears the needle valve and allows the annular float to lift the valve. Thus the greater the suction of the engine the greater the amount of fuel delivered.

The same principle, too, has been employed for the kerosene float feed, and the idea has further been utilized as a means of regulating or changing the fuel. This is best seen in the general arrangement drawing, where the vacuum pipe A from the intake is led up to a four-way valve on the dash, which can either put this vacuum

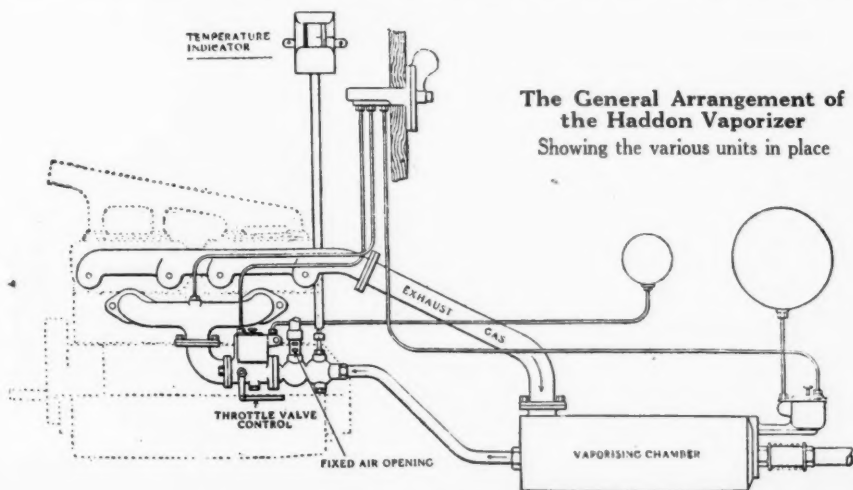


Sectional View, Showing the Kerosene Injector and the Gasoline-Float Regulator

The vacuum tube is seen at B. The air-regulating slots and the sleeve regulating the openings are also shown. An electric temperature indicator is seen at G, but as a rule a mercurial indicator is now fitted.

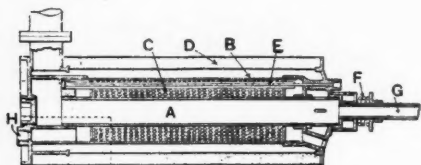
pipe, by means of others, into connection with the top of the gasoline float feed, the top of the kerosene float feed to both, or into a neutral position connecting with neither.

In working them the driver starts on gasoline with the valve connecting pipe A with pipe B. When he turns his engine crankshaft round them, the suction causes the diaphragm in the gasoline float feed to lift, with the result that gasoline drops on the floor, so to speak, of the intake. Though for starting the throttle should be shut, mixture is still able to reach the engine through a V-shaped slot or notch cut on the lower edge of the throttle, and consequently the air passing over the gasoline dropped in the throttle valve chamber rushes through this notch at sufficiently great velocity to mix the gasoline vapor with it. The engine offers no difficulty at starting, and after it has been running for a short time the vaporizer is sufficiently warmed to turn on to kerosene. In changing over, therefore, the driver puts the vacuum valve into the second position, al-



The General Arrangement of the Haddon Vaporizer
Showing the various units in place

lowing the gasoline to feed to the carburetor and kerosene to the vaporizing chamber. This position, however, is never maintained for more than a few seconds—just long enough to give the vaporizer time



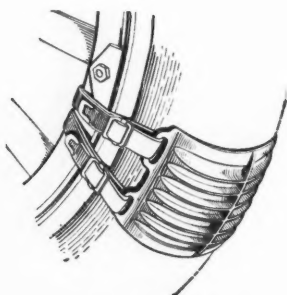
Sectional View of the Haddon Vaporizing Chamber

The central tube is seen at A and the annular exhaust space at B, the sleeve containing the heated material at C, the asbestos lagging at D, the kerosene being introduced through the pipe seen at E. The end cover is held to the chamber by pressure of the spring at F, thus it allows for expansion under heat, and can be easily detached. The exhaust escapes at G, and the vapor is taken to the engine by the outlet at H.

to pick up—and so the driver very soon changes to the third position, which feeds only kerosene gas to the engine. In running down hill the valve can be put over to the fourth position, in which both fuels are cut off, and in changing from kerosene to gasoline it is advisable to adopt this position for a few seconds to allow any gas in the vaporizing chamber to be exhausted; then the driver can change on to gasoline. From the foregoing it should be clear that, whether running on gasoline or kerosene, the speed of the engine is governed by one throttle only. Furthermore, the proper moment for changing over from gasoline to kerosene is determined for the driver by the reading of a mercurial thermometer on the dashboard, which is in connection with the vaporizing chamber.

MUD ROAD GRIPS

The Anti-Skid Appliance Co., 1037 Majestic Building, Detroit, Mich., is offering a new accessory known as mud road grips. This device is designed to strap over the tire and assist in securing traction when the car encounters ruts, mud, sand, snow or ice. The grip is described as being made of high-grade malleable iron, carefully cleaned and lacquered to prevent rust. The web straps used to retain the device are made of web belting, which is claimed to be superior to leather for the



Mud Road Grips

This illustration shows the Mud Road Grip strapped to a tire. The maker claims that this device will assist in securing traction under any conditions.

purpose. Mud road grips come in two different sizes: the small size for 3 and 3½ in. tires, which sells for \$.75 each, and the large size for 4, 4½ and 5 in. tires, selling for \$1.

JOHNSON'S CARBON REMOVER

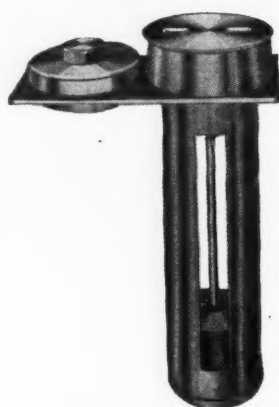
S. C. Johnson & Son, Racine, Wis., is putting out a liquid carbon remover which is claimed to loosen up and soften the carbon in the cylinders without any harmful effects on the engine. The directions accompanying this product advise the introduction of four tablespoons of the liquid into each cylinder after having removed



Johnson's Carbon Remover

This liquid is said to remove carbon deposits from automobile engines and drive it out with the exhaust.

the spark plugs. After 2 or 3 hours or overnight the engine is started and the carbon is said to be expelled with the exhaust. Johnson's carbon remover sells at \$.50 per half pint, \$.85 per pint and \$1.50 per quart.



Gasoline Meter

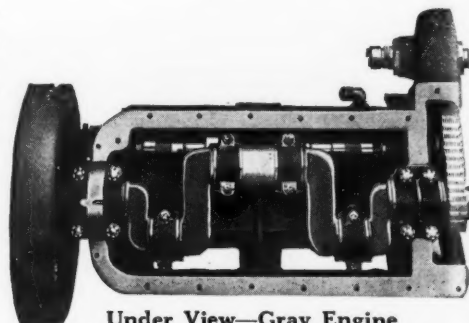
This meter can be installed in any shape or kind of tank and is adaptable for any automobile tank. The maker claims that it gives a computed record of the amount of gas consumed daily, weekly, monthly and yearly and shows how many miles to the gallon the car is giving. The above cut represents the meter with locking device attached to the filling cap. The idea of the locking device placed in the filling cap is to lock the computed side of the meter so that the computed amount of gasoline cannot be changed until gas is put into the tank again. As soon as gas is put into the tank and filling cap is closed it automatically locks the computed side of the meter, leaving the daily record open so as to record daily contents and quantity in tank. The Gasoline & Oil Meter Company, 361-371 Avenue A, New York City, is manufacturing this device.

FOUR-CYLINDER MODEL F GRAY ENGINE

With the importance of endurance and durability as necessary qualities of every successful tractor or truck engine firmly fixed in their minds the experienced engineers of the Gray Motor Co., Detroit, have designed a four-cylinder in block engine which possesses these valuable characteristics to a splendid degree. The engine is not, however, unduly heavy; in fact, it is distinctly of light weight but without any sacrifice of strength. The total weight of the complete engine, including carburetor and magneto, is 396 lbs. The four cylinders are cast in block, and have a bore and stroke of 3 x 4 in. The valves are placed at the left, are of poppet type, 1 5-16 in. in diameter and with a ¼-in. lift.

The engine is water cooled, having very liberal sized water jackets. Water circulation is by gear pump or thermo-syphon. Accessibility is another big asset of this Gray model "F," as it is known, large hand-hole plates on either side of crankcase giving ready access to the interior. All moving parts, except, of course, the flywheel, are enclosed and the engine is absolutely dustproof. Valve springs and tappets are covered with removable plates. Either three or four-point suspension may be had. The make of carburetor and magneto is also optional. The governor is a Pierce, loose ball type, and is driven from the engine.

Particular attention is directed to the size of the crankshaft and bearings of this en-



Under View—Gray Engine

Lower portion of crankcase is removed to show the interior

gine which account, in part, for the great strength and endurance this engine possesses. A 2½-in. shaft is used, certainly liberal diameter for a 3-in. bore engine. The forward main bearing is 3½ in. long, the rear main bearing being 3 in. long. Connecting-rod bearings are 1¾ in. long.

Lubrication is by pressure feed through drilled crankshaft combined with the splash system, comprising an oiling system that is positive, automatic and highly efficient. The engine is perfectly oiled no matter at what angle it is placed. A sheet metal fan is used, driven by a flat belt. For tractors, light trucks and cars requiring a highly efficient engine of great durability which will be found reliable and dependable after years of this hard and exacting service, this Gray model "F" will be found ideal. It is built by one of the largest and most experienced gasoline engine manufacturers in the business.



Motor Truck Design and Construction Made Plain Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is a series of articles by this well-known writer, covering in a non-technical way, the various constructions now current practice in commercial car design. Preceding articles covered General Types of Chassis, Two and Four-Cycle Engines, Types of Cylinders and Their Parts, The Valve-Operating Mechanism and the Crankcase, Engine Lubrication, The Engine Cooling System, Carburetion and Carburetors, High-Tension Magnetos, Low-Tension Magnetos and Battery Systems, Inductor Magnetos, Governors and Speed-Controlling Devices, Clutches, Unusual Features of Design, Transmissions, The Universal Joint and Differential, The Final Drive, Front and Four-Wheel Drives, Brakes, The Front Axle, The Steering Gear, The Frame, Power Plant Arrangement and Its Mounting, Springs and Suspension, Motor Truck Wheels, The Muffler, The Fuel Supply System, Controls.

MOTOR TRUCK TIRES AND RIMS PART XXVI

IN the previous chapters considerable has been mentioned about tires and their functions. However, in this chapter the construction of a motor truck tire and its mounting on the felloe band of the wheel will be described. To be absolutely efficient, a commercial car must be able to carry its load whenever and wherever needed. The vehicle itself may be as nearly as possible absolutely efficient, when measured by this standard, but as a whole it can be no more efficient than its weakest part. Each part must be so designed and so co-ordinated with other parts as to perform in the most efficient manner. In this respect the tires are no exception.

The functions which the tires perform, reduced to their simplest terms, may be listed as follows:

- 1—To give traction to the wheels and prevent slipping.
- 2—To protect the mechanism of the vehicle from jars and vibration.
- 3—To cushion the load.

Tire Development

Before the advent of the motor truck, solid rubber tires were used almost exclusively on the wheels of carriages to provide easier riding. On these vehicles the wheels were merely rolling members and performed no tractive effort, as the horses did the pulling. Such tires were held in place by means of wires embedded circumferentially in rubber, the whole unit being mounted on a steel channel shrunk on the felloe of the wheel. These tires were easily applied, but possessed certain disadvantages such as slipping in the channel, cutting at the base and release of the rubber adjacent to the wires.

This type of tire did not prove very satisfactory for heavy vehicles, for the reasons mentioned above. In order to overcome these short-comings, a new tire was introduced, which was called the side wire type. In general shape and appearance it was the same as the earlier type. However, it was retained in the channel by means of short cross wires embedded in the base of the tire, which projected on either side. These cross wires were held in place as securely as possible by two other wires running circumferentially around the base just inside the edges of the channel.

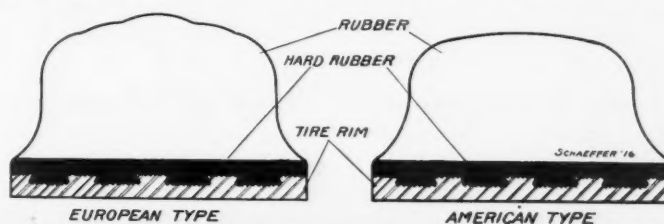
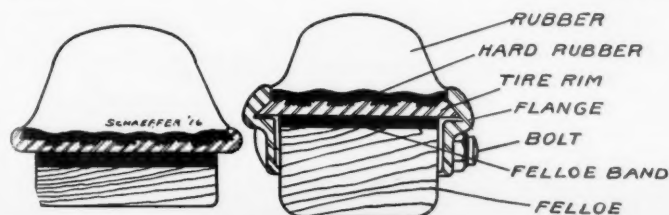
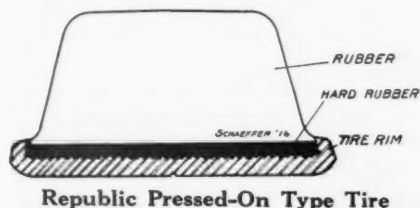
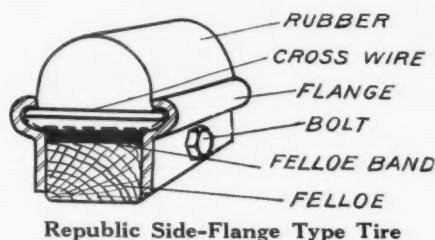
With the introduction of the commercial car, an entirely new and different function was required of the tires, that of transmitting the driving power from the rim of the wheel to the road surface, i. e., the tires became part of a tractive rather than a rolling member. Their carrying capacity was also increased because the gasoline engine could move heavier loads than the horse, while the weight of the truck itself was

considerably more than the wagon, and the speed was also increased considerably. The carriage type of tire was found entirely too light to perform the work required of it. This condition brought about the invention of the solid motor truck tire, a tire vulcanized in circular endless form to fit the dimensions of the wheel. This type of tire has been brought out in different designs and types such as flange, internal wire, side wire, hard rubber and metal base types, also the demountable.

Carriage tires were made in oval shape, in cross sections from $\frac{3}{4}$ in. to 2 in. and of compound rubber which is forced through a tubing machine die, vulcanized in long moulds with many cavities, in the shape in which it had been designed.

The construction of solid truck tires that have been put on the market, is very similar in a general way. The rubber is forced through a die or tubing machine, or built up from sheets of calendered stock in endless form to fit the exact dimensions of a wheel on a particular style of base or retaining body of the tire as designed by the different manufacturers, according to their ideas, which have taken various forms, such as circumferential and side retaining wires which are engaged over embedded cross wires, bases of hard rubber in various forms, also semi-hard rubber which can be moulded into the tire and more recently the metal base type.

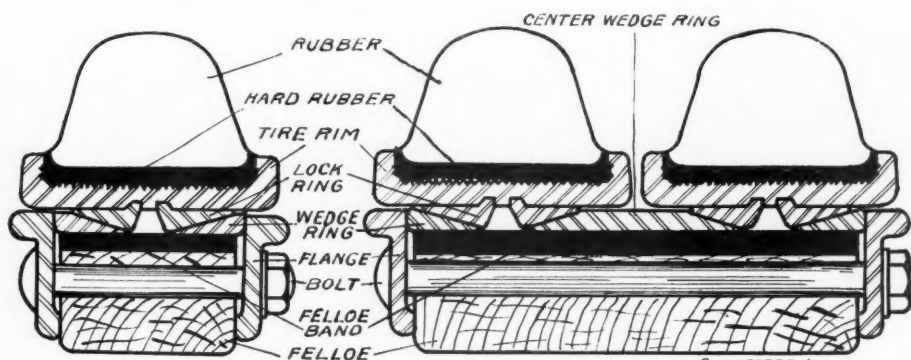
This tire is built on to the rim at the factory and cannot be separated from it. The surface of the metal rim is cut with grooves, under cut notches or in other ways, so that the hard rubber gets a firm anchorage into the rim. In manufacture this rubber base is applied in some factories in layers, just as you wrap a bandage on your finger. The base is relatively thin, perhaps not one-eighth the radial thickness of the



tire. On the top of this is built the regular rubber part of the tire, of softer rubber to afford the desired resilience. This part is also in some factories built up similar to wrapping a bandage until the desired thickness is obtained, which, when done, the tire is trimmed to shape and vulcanized.

Two Metal-Base Types

This metal base tire is made in two types, the pressed-on and demountable. In the larger cities, the former is quite popular, whereas, in the smaller outlying cities and towns the demountable type has the follow-



Kelly-Springfield Demountable Type, Single and Dual

ing. The reason for this is: To remove a pressed-on tire from a truck wheel or put one on a truck wheel requires a powerful press, which means a considerable outlay to the dealer in proportion to the amount of work he may get.

The demountable tire can be removed from the wheel and a new one fitted, without the truck owner having to take it to a garage. Unfortunately it is more expensive than the pressed-on tire, due to the forged and rolled steel parts used with it.

Rubber

Crude rubber is a vegetable product gathered from certain species of tropical trees, shrubs, vines and roots. It was first introduced in Europe in 1735. It was first used for pencil erasers and in waterproof cloth and finally in solution in cements. Vulcanizing or curing rubber was discovered in 1844; thereafter the development of the industry was rapid, though it was but an infant in size, compared with now, up to the development of the automobile industry.

There are many kinds and grades of rubber, and these may be divided into two classes, wild and cultivated.

Wild Rubber

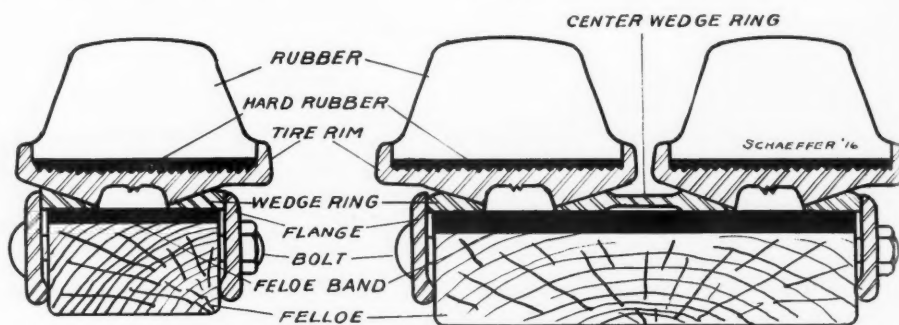
This is collected from trees that have grown wild and where there has been no cultivation process. Such trees and shrubs are found mostly in Northern South America, Central America and Central Africa. Fine Para comes from the Amazon region of South America. For over a century this rubber has been gathered in practically the same way. The native goes into the forest, selects a tree, cuts V shaped grooves in the bark with a knife made for that purpose, the grooves being cut in herring-bone fash-

When full these cups are gathered and brought into the rubber camp, and there the latex is coagulated by means of smoke. This is done by the use of a paddle, which is alternately dipped into a bowl of latex and then revolved in the smoke from a wood or palm nut fire. This smoke seems to have a preservative effect on the rubber as well as drying it out and causing it to harden on the paddle, each successive layer of latex causing the size of the rubber ball or biscuit to increase. When a biscuit of sufficient size has been coagulated it is removed from the paddle and is ready for shipment. There are other grades of rubber which are coagulated by adding some alkaline solution and allowing it to dry out. Central America produces a grade of rubber which is cured by being mixed with juices which are obtained by grinding up a certain plant which grows in that district.

In Central Africa some of the rubber is gathered from trees, but most of it comes from vines and roots, and the methods of coagulation are varied. Practically all of them are dried out in the sun.

Cultivated Rubber

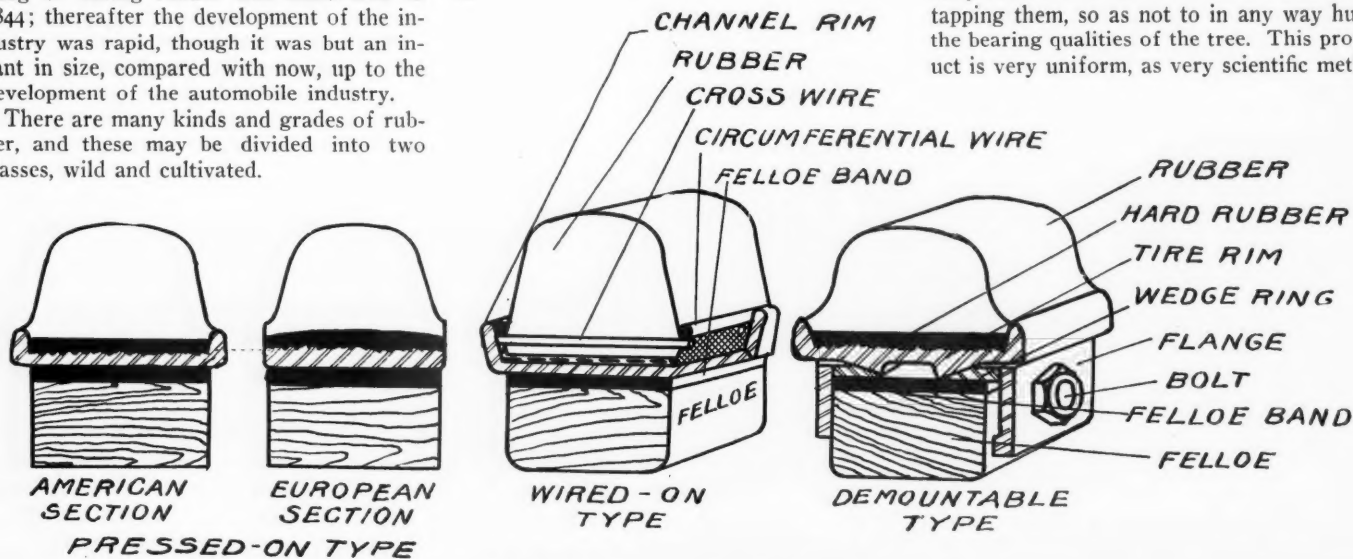
Cultivated rubbers are obtained from East India, Ceylon, Malayan Peninsula and



Goodyear Demountable Type SV, Single and Dual

ion around the tree, with one main groove down the center like the main vein in a leaf. The latex of the tree (not the sap) flows from the smaller veins and down the center vein into a little cup placed to receive it.

Southern Mexico. The claim is made that the best of these is the Ceylon rubber, which has been grown from sprouts taken from the wild Para trees of South America. These cultivated trees have been very carefully reared and scientific methods used in tapping them, so as not to in any way hurt the bearing qualities of the tree. This product is very uniform, as very scientific meth-



Firestone's Variety of Solid Tires

Plenty of the right kind of circulation means quantity results to advertisers in the CCJ

ods are used, coagulating, drying and otherwise treating the rubber before it leaves the plantation, so that there is a minimum deterioration due to oxidation and other actions during the time the rubber is en route from the plantation to the manufacturer. Of late, far east rubber is being given the preference, because it is cleaner and contains less foreign matter than the wild para.

Manufacturing Process

This rubber as it comes into the market, contains a lot of impurities, and before it

and each band or base must check within certain limits. Demountable rim parts are made in a similar manner and must also be held within certain limits.

The Solid Truck Tire

A number of illustrations are shown herewith, which give the contour and general construction of the solid tire. The Firestone wired-on tire is made and recommended for use on light vehicles only. This tire is not manufactured into the rim as is the hard rubber base type, but is afterward

These various makes differ in the contour of the tire, the method of producing a firm grip for the hard rubber on the steel and the method of building up the tire, while the demountables differ in rim construction. In some cases the metal base is cut in dovetail fashion and with grooves, such as the Hood, Polack and Goodrich. In the Gibney and Kelly, the hard rubber is carried up to the side of the metal base, while in others it is set straight across the width of the channel base. In some cases the layer of hard rubber is given an irregular wave line surface such as the Goodrich in order to increase the area of contact between the two grades of rubber.

The metal base or rim of a demountable tire has the inner circumference tapered from both sides, its smallest diameter being slightly larger than the outside diameter of the felloe band. Rings which have a tapered surface and are usually termed wedge rings, since their cross section is of wedge shape, are inserted between the felloe band and the tire base. These are retained by circular flanges and bolts which pass through these and the felloe of the wheel.

Most tire manufacturers use this construction, however; the Goodrich demountable differs somewhat in that the wedge section is incorporated in the tire base against which the side flanges press. The rubber portion of a solid tire is usually about $2\frac{3}{4}$ in. high and varies in width according to its design. This of course, governs the elasticity and cushioning effect. On the large single tires, this height does not give a proper proportioning and to overcome this some makers produce what is commonly called the European type of tire in which the rubber is from $\frac{1}{2}$ to 1 in. higher. The Goodrich Co. calls this their De Luxe type

can be used it has to be washed. This washing is done between rolls which are grooved to tear the rubber apart, water being fed on the rolls to wash off all foreign matter. In this process the rubber loses considerable of its weight.

When the rubber is washed and dried it is mixed with chemicals and into a compound. These chemicals and particles of rubber are placed in metal boxes a couple of feet square. The formula for these compounds are, of course, kept secret by the rubber factories, because they represent the outcome of very long and tedious experiments which are looked upon as one of the chief assets of any rubber mill. These masses of compounds are chewed and rechewed, ground and re-ground, extenuated and re-extenuated, between the giant steel rolls of the calendaring machines that are needed just to thoroughly mix the ingredients. Each compound requires its separate mixing, its special treatment.

The rims to which the hard rubber is vulcanized are in most cases copper plated, as rubber compounds do not take kindly to steel. The hard rubber base is applied to the metal rim and then the tire is completed as previously mentioned.

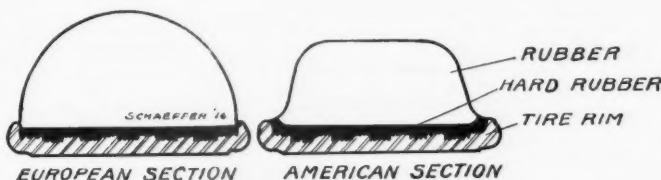
The compound rubber is in graduated consistencies from the hard rubber base, which forms the inside circumference next to steel base, to the resilient rubber forming the wearing part of the tire.

When the tire is completed it is pressed into moulds which are securely bolted and placed in large cylindrical vulcanizers which vulcanize or cure the rubber. When this process has been completed and the tires have cooled, slight edges remain which are buffed off.

Rims

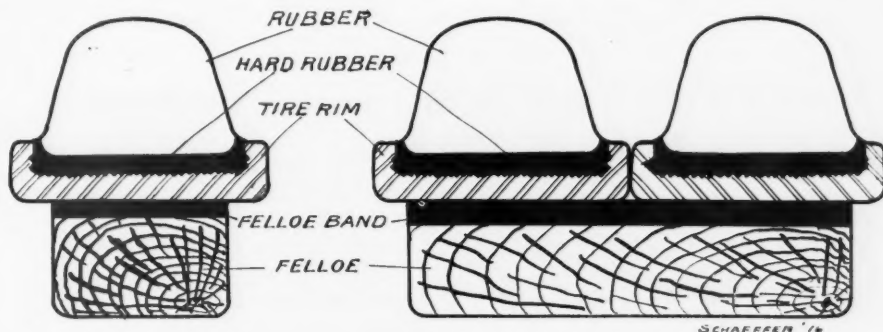
Tire rims or metal bases and felloe bands are usually made from flat stock and rolled to shape, and the ends are welded together. Special machinery is used for this purpose

attached to the rim. Into the base of the tire are placed stout cross wires at frequent intervals. When this tire is placed on a channel rim it is held in place by two circumferential wires, one



Hood European and American Section of Pressed-On Type Tires

at each side of the tire, these wires resting upon the ends of the cross wires, by virtue of which the tire is retained on the rim. Swinehart manufactures what is called a



Kelly-Springfield Pressed-On Type, Single and Dual

soft base tire, with cross wires for holding it in the channel rim. Several other makers also manufacture tires which are retained by cross or circumferential wires.

The hard rubber base tire as previously mentioned is built onto the rim at the tire factory. This type of tire is being made by Goodrich, Firestone, Goodyear, United States, Republic, Kelly-Springfield, Gibney, Swinehart, Hood, Polack, etc., in the single and dual, pressed-on and by some in the demountable types, some of which are illustrated.

and while it is designed after the European type, it has quite a different contour. Greater resilience is claimed for these types as well as longer life and greater load carrying capacity. A greater carrying capacity is possible, because the contact with the road surface is much larger, consequently the weight is distributed over more base area. The greater height of rubber and increased resiliency also give an entirely different traction hold on the road. Some tire makers recommend this type of tire as an oversize

for the American type, since it is made to fit the S. A. E. standard felloe bands.

The Goodrich Co. has recently introduced a new policy with regard to single and dual tires for heavier truck work. This company is recommending a 7 in. single in preference to 4 in. duals, 6 in. singles in preference to 3½ in. duals and 5 in.

ally overloaded and perhaps permanently injured by this frequent caring for the entire load weight on one wheel. With singles this is not the case.

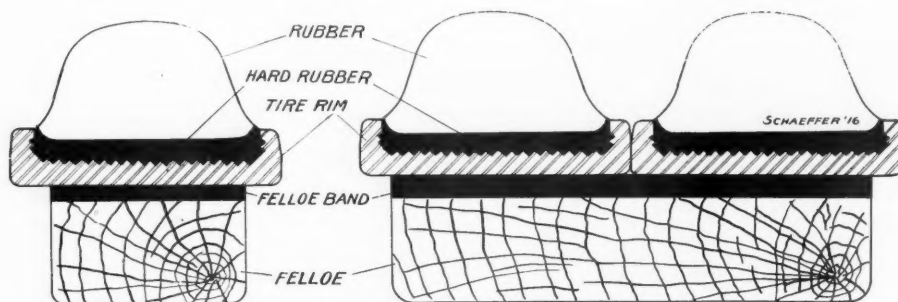
Firestone has recently introduced what is known as a giant single solid tire made in 8 or 12 in. width. The extra amount of rubber is claimed to make it oversize equip-

and allow the outside tire to take its share of the load.

Conclusion

The pressed-on tire will no doubt gain in popularity, as it is less expensive than the demountable type, since wedge rings, flanges and bolts are eliminated, while the firm fit to wheel also insures the greatest possible mileage. Practically all makers are continuing their demountables, but the number produced is on the wane. This type will no doubt be continued for some time, since powerful hydraulic presses that cost \$500 to \$700 are required to apply the pressed-on type. This, of course, is a considerable outlay for the tire dealer in proportion to the work he may get at present. However, the demand for trucks is continually increasing and, in order to assist the dealer in obtaining his share of the business, some tire companies are selling these presses at the rate of \$100 down and \$100 per year until paid for, on condition that it is used only in connection with tire made by that company.

The claim made for the European type of tire is that owing to its higher section and greater resiliency it greatly reduces the cost of upkeep of the mechanism of the truck, and makes it far more comfortable for the driver.



Gibney Wireless Tire, Type MIB, Pressed On

singles in preference to 3 in. duals. The arguments are that these singles give better results than the corresponding duals, in that often on the road one of the duals has to take the entire weight of the load on that wheel and that, as it is not designed to take the entire load, it is natur-

ally overloaded and perhaps permanently injured by this frequent caring for the entire load weight on one wheel. With singles this is not the case.

The Hood Co. recommends its European type of tire for dual equipment, as they claim this type with its greater resiliency will allow the inside tire to compress more

Good Roads and Trucks

By GEORGE W. GRUPP

HISTORICALLY, roads were built for the army and for strategical purposes, but that is not so today. Today roads are being built so as to afford better and swifter means of communication in the transportation of products, etc. But are good roads being built for trucks or are the trucks being built for roads? This is a question which the COMMERCIAL CAR JOURNAL representative asked W. A. Perry, of the National Automobile Chamber of Commerce.

"The answer to your question," replied Mr. Perry, "is: yes, in both cases. Trucks are being built to stand up under rough roads, and roads are being built to make the truck a more important factor. Also, please remember, motor trucks were in existence before good roads. Therefore it is easy to see why trucks are largely responsible for this attitude regarding the building of real good roads."

Reaching for a document on his desk, he said: "Here is some up-to-date proof that trucks are the responsible agent for good roads. At the last session of the New Jersey Legislature this bill, known as the Egan Bill or Senate Bill No. 126, was passed. It provides for a bond issue of \$7,000,000 for the construction of roads. I will quote part of it:

Section of the Egan Bill

"(Section 4, line 1—The State highways herein provided for shall be paved with granite, asphalt or wood blocks, brick,

concrete, bituminous concrete, asphalt or other pavement having a hard surface and of a durable character."

Interest to be Paid by Motorists

"Then in Section 4, line 25, it provides: 'The interest on the bonds issued under this act and the principal of said bonds coming due each year shall be paid out of the moneys received from motor vehicle registration fees, license fees, fines and penalties, etc., etc.'

"And at the close of the act the following provision is made: 'Shall the act entitled (An act creating a highway commission and to provide for the construction, reconstruction and improvement of certain State highways, providing for the payment of the cost thereof from the proceeds of the sale of bonds to be issued to an amount of seven million dollars, and providing for the payment of the principal and the interest of said bonds from the motor vehicle license fees, registration fees, fines and penalties) be adopted?'

"This is being placed on the ballot of New Jersey, and the people will vote yes or no on the question."

Truck Responsible for Good Roads

"From this one can see," he continued, "that motor vehicles are responsible for the construction of good roads. Further it shows that motor vehicles are paying for them, and not the horse-driven ve-

hicle operator, who has the privilege of using them.

"This bill should be ratified by the people of New Jersey because it is costing New Jersey \$1000 a mile per year to maintain her macadam roads, which, if they were constructed of concrete instead as provided in this bill, it would then only cost the State \$50 a mile per year.

"While it is true that a macadam road can be built for \$6000 a mile less, yet the saving in upkeep would soon offset the difference in cost of construction. Besides, I don't know of a road made of concrete which has worn out, but I do know of a great many macadam roads which have.

"Second, this bill should be ratified because the farmers will profit very materially by it. It will mean hard, smooth and level roads. They will be able to carry heavier loads on their vehicles. And besides they will be in a better position to take advantage of the advance in prices on products which they are raising, because the good roads will afford swift communication.

"Third, it should be ratified because it will help to increase the valuation of the property along these roads."

All of the foregoing is but a mere trifle as to what is actually being done along these lines. Motor trucks everywhere are demanding good roads. Thus swift and smooth avenues of communications are possible.

The CCJ is built upon the lasting foundation of honest circulation

Capacities of Commercial Car Cooling Systems

For the Convenience of Garagemen and Others Desiring to Mix Up Anti-Freezing Solutions for Winter Use, We Have Compiled the Following Table Giving the Total Capacities in Gallons of the Cooling Systems of Commercial Cars

Armleder	Gals.	2 ton Models H (1913).....	Gals.	K-35 2 tons	Gals.	Model A, 2 ton	Gals.
1910-11-12-13-14-15-16	12	2 ton Models I, IA4, IAW and IBW (1914-15-16-17)...	6	K-36 2½ tons	9¾	Model T, 3 ton	8½
1910-11-12-13-14-15-16	16	Ellsworth		K-40 3½ tons	16½	Rush	
1½ tons	16	1916-17 Model 25-A.....	3	K-45 4 tons	16½	1915 Model B	3
Autocar		Four Wheel Drive		K-50 5 tons	16½	1916 Model D	5
Type XXI-F 1½ and 2 tons 4½		1914 Model B	6½	Koehler		Service	
Blair		1915 Model B	8½	1912-13-14 Model A (2 cyl.)	5	Prior to 1914	5
2 and 3 tons (all models)...	7½	1916 Model B	10½	1915-16-17 Model K (4 cyl.)	5½	1914 Models H, P and Q....	5½
4 and 5 tons (all models)...	9½	1914-15 Model G	8½	Lane		1915 Models HW, PW, W and QW	5½
Boyd		1915-16 Model M (Bush Rad.)	10	Model A	6	1916-17 Model 120	6
3 ton Four Wheel Drive...	9½	1915-16 Model M (Perfex Rad.)	11¾	Lippard-Stewart		1916-17 Models 130, 140 and 170	5½
Aerial Truck	16	G. M. C.		Model MW	4½	1916-17 Models 175 and 200...	10
Worm Drive Combination Cars, Tractors & City Service Trucks	11½	1915-16 Model 15	4¼	Models B, C and D.....	3¼	Star	
Chain Drive Cars	9¾	1916 Model 21	6	Model H	3¾	Model A	3½
Chase		1915 Model 25-26	6	Models F and G.....	4½	Model W	8
Model O, 3½ ton.....	8	1915-16 Model 30-31	6	Little Giant		Sterling	
Models X and B, 3 and 2½ ton	7½	1915-16 Model 40-41	7¼	1909-10-11-12-13 Model D...	3½	2½ and 3½ tons	7
Models C and A, 1½ and 1 ton	6	1915-16 Model 70-71	9	1913-14-15-16-17 Model H...	6	5 and 7 tons	9
Corbitt		1915-16 Model 100-101	9	1915-16-17 Model 15	7	Sullivan	
Models A, B and C.....	6	Hall (Lewis-Hall Iron Works)		1915-16-17 Model 16	8	1912 Model L	3¾
Model D	5	3½ and 5 tons.....	9	Mercury (Gas Tractor)		1913-14 Model K	3¾
Croce		2 tons	7	Model A	8½	1915-16 Model G	3¾
Model 16, ½ ton.....	3½	Harvey		Netco		1916 Model E	5
Model 17	3½	F-1½ ton chain 1910-11-12-13-14-15	10	One model only	6	Trojan (Commercial Truck Co.)	
1½ ton	4	WH-3½ ton worm 1915-16-17	13	Old Hickory		Models 26 and 27	4½
2½ ton	4½	WF-2 ton worm 1916-17.....	12	All models	4	Superior (Willingham's Sons)	
Dart		WK-5 ton worm 1916-17.....	15	Packard		1915-16 Model A	4½
Models C and CC	6	Hurlburt		2 ton (chain)	7	1915-16 Model C	4¾
Models B, BB and E.....	5	1915-16-17 1½ ton	8	3 ton (chain)	9	Watson Tractor Truck	
Model A	4½	1915-16 2 ton	8	5 ton (chain)	10	1915-16-17	10
Day-Elders		1917 2 ton	10	1, 1½ and 2 ton (worm)...	7¼	Wilson	
¾ ton	3	1915-16 3½ tons	8	3 and 4 ton (worm).....	9¾	1913-14-15-16	6¾
1 ton	5	1917 3½ tons	10	Peerless		Witt-Will	
Dispatch		1917 5 tons	11	Truck	5¾	1913-14-15 Model E 1 ton (chain)	8
1915-16 Models D, G, H, L and N	5	1915-16-17 7 tons	12	Pierce-Arrow		1913-14-15 Model P-2 2 ton (chain)	8
1917 Models D, G, H, L and N	5½	International Harvester		All trucks	10	1913-14-15 Model R 4 ton (chain)	10
Dorris		AW, MW and E	4½	Republic		1915-16 Model D 1 and 2 ton (worm)	7
1500 lb. Model H (1913)....	3¾	F and H	6½	Model 9, ¾ ton	4½		
1500 lb. Models I and IA4 (1914-15)	4	Kelly-Springfield		Model 10, 1 ton	7		
		K-30 1 ton	9¾	Model 11, 1½ ton	7		
		K-31 1½ tons	9¾				
		K-32 1½ tons	9¾				

Non-Freezing Solutions

PURITAN ANTI-FREEZE

The Puritan Soap Co., Rochester, N. Y., has recently announced to the trade the Puritan Anti-Freeze Compound for use in automobile cooling systems. Puritan Anti-Freeze is a saturated solution and is said to be harmless to any part of the automobile with which it comes in contact, and contains no alcohol, glycerine or acids of any nature. It is said that Anti-Freeze retards boiling rather than accelerates it. A scale shown on the can indicates the proportion of this compound used to produce varying freezing points. It is possible, so the company says, to get a freezing point of 21 deg. below zero. Detailed directions for use are on each can. One part of Anti-Freeze and one part of water produces a solution that will freeze at no higher temperature than 21 deg. below zero. One part of Anti-Freeze and six parts of water will freeze at 24 deg. above zero.

This compound is put up in the standard Puritan can, finished in yellow, red and black. The can has a pouring spot. The retail price is \$1 per gal.

50 per cent. Anti-Freeze freezes at 21 below; 40 per cent. at 5 below; 34 per cent. at 5 above; 29 per cent. at 11 above; 25 per cent. at 14 above; 20 per cent. at 19½ above, and 15 per cent. at 24 above.

WOOLNER'S ANTI-FREEZING SOLUTION

This anti-freezing solution is made up of completely denatured alcohol (100 parts grain alcohol, 10 parts wood alcohol and ½ part benzine). Following is a table to provide the correct proportions for various degrees temperature.

10 per cent. equals 25 degrees above zero, 15 per cent. equals 20 degrees above zero, 20 per cent. equals 10 degrees above zero, 25 per cent. equals 7 degrees above zero, 30 per cent. equals 5 degrees below zero, 35 per cent. equals 12 degrees below zero, 40 per cent. equals 20 degrees below zero.

The per cent. column represents the portion of solution to be used, the balance to be water. The 188 proof is sold in 5 gal. cans at \$.62 per wine gal., and the 180 proof at \$.61, both f.o.b. Peoria, Ill. It is made by Woolner & Co., of Peoria, Ill.

RIE-NIE WINTER FLUID

This is a non-freezing compound designed to be used in the cooling systems of automobiles, it being readily soluble in water and mixed with it in certain proportions for the various temperatures to be withstood. It is always of the same strength, for it is claimed the essential elements never evaporate. This fluid will not freeze solid at 65 degrees below zero, and has a higher boiling point than water.

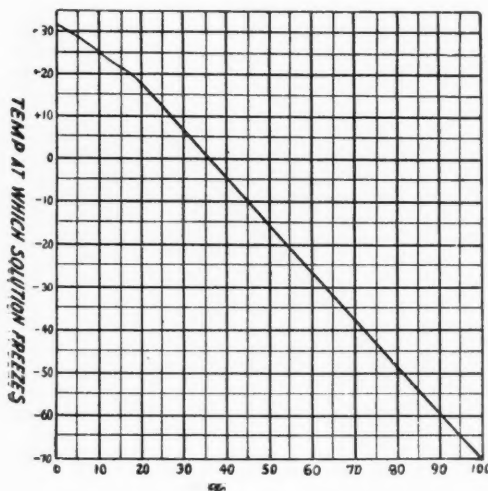
The following table is furnished by the maker:

Per cent. Rie-Nie	Degrees to which it will not freeze
17	20 above
20	10 above
25	5 above
29	5 below
34	10 below
50	30 below

This fluid is made by the Durkee-Atwood Co., of Minneapolis, Minn. Price, \$1.25 per gal. can.

THERMITE

This solution when added to the water of the cooling system is claimed to give protection against damage from the freezing of the water. It is non-inflammable. The above curve tells exactly at what temperature any given solution of Thermite will freeze. This enables you to make up a solution that will give you protection at any temperature you desire. Thus, if you



Thermite Freezing Chart

wish to be protected at 15 deg. below zero, make up a solution that will freeze at 20 deg. below zero and you will have the desired protection. To make up this solution follow out the line marked -20 until you come to the curve, then follow the intersecting line down and you will find that a 55 per cent. solution will freeze at 20 deg. below zero. The price is \$1.25 per gal. Made by the Northwestern Chemical Co., Marietta, O.

JEWEL NON-FREEZING SOLUTION

This preparation is claimed to have no chemical action on iron, and to be very strong. It is diluted in various proportions to prevent freezing of the water at different temperatures. It consists of a scientific preparation of denatured alcohol and refined glycerine. The following table shows the percentage of non-freezing solution to be used at or above certain degrees temperature:

Per cent. of solution	Temperature
20	10 degrees above
28	5 degrees below
39	20 degrees below
50	34 degrees below

This preparation is offered by the Wadsworth-Howland Co., 219 Carpenter St., Chicago. The latest price quoted was \$.60 per gal. can net.

BOYER'S NON-FREEZING SOLUTION

This is a 100 per cent. pure non-freezing solution for automobile radiators and is a concentrated liquid. It is composed of chemically pure refined white glycerine and 188 proof denatured alcohol. It is retailed in 1-gal. cans. The contents of one can and 3 gals. of water freeze at 12 deg. above

zero. When mixed with 2 gals. the mixture freezes at zero and, mixed with 5 qts. or 1¼ gals., it freezes at 14 deg. below. The respective percentage of the Non-Freezing Compound used in each instance is 24 per cent., 32 per cent. and 43 per cent. It is made by the Boyer Chemical Laboratory Co., of 18 E. Kinzie Street, Chicago. Price, \$.85 per gal. can.

OPCO RADIATOR OIL

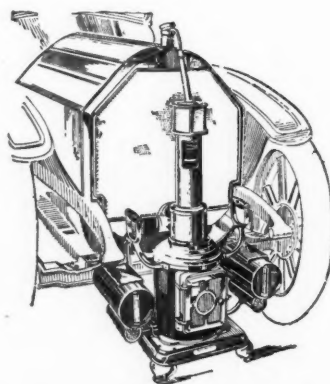
Although Opco Radiator Oil is designed primarily to prevent rust and the formation of scale, it is also valuable in cold weather in that it prevents the rapid evaporation of alcohol when mixed with water to prevent freezing. It also prevents the alcohol from pitting the metal. It acts as a binder for the alcohol, reducing greatly the evaporation, but not entirely since water itself evaporates. When using this oil as an anti-freeze, it is necessary to mix the radiator oil with the water first and then add the alcohol. To withstand 20 degrees below zero, 3 oz. of radiator oil should be added to each gallon of water, and to this solution should be added 3 pts. of alcohol. For zero weather add 1 qt. of alcohol to the solution, and for 10 to 12 deg. above zero 1½ pts. of alcohol to the same solution will be ample. This oil sells for \$1 per can of 32 oz., enough to treat 10 gals. of water. It is made by the American Oil Products Co., of Buffalo, N. Y.

NEVEROUT HEATERS

The Rose Mfg. Co., of 910 Arch Street, Philadelphia, Pa., offers the Neverout Radiator and Garage Heater, to prevent the freezing of water of the cooling system while the car stands over night in the garage. It will thus eliminate the necessity of installing a heating system and is very economical as it is used only when the car stands in the garage. It is made in three types, one to operate from electric current, one from the gas supply, and one from kerosene.

The Oil Heater

This type heater burns kerosene commonly called headlight or coal oil. The capacity is 2 gallons, which will burn from 36 to 48 hours with one filling, according to the size of flame. This large capacity



Showing Neverout Oil Heater Attached to Water-Circulating System of Engine

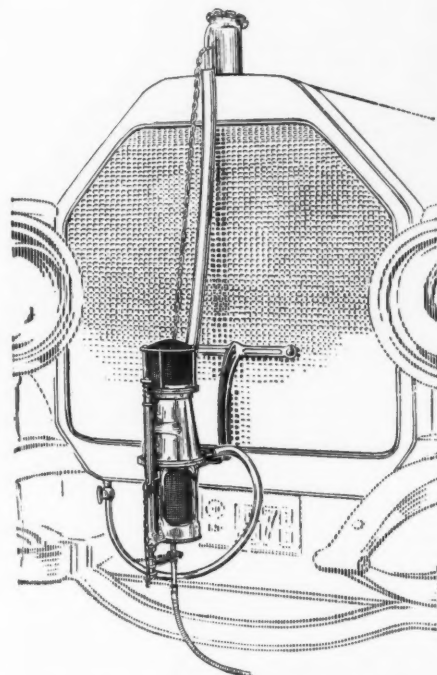
makes it possible for the automobilist to let his car stand for a considerable length of time, practically two days, the gages on the front of the tanks plainly showing how much oil is available at all times.

The tanks, which have been divided so that they hold one gallon each, are conveniently placed on either side of the heater in order to balance same. This permits the filling of the tanks separately. It must be noted that the tanks can be refilled without extinguishing the flame, as the sub-tanks at the lower part of the main tanks contain enough oil to burn while the upper tanks are being refilled. The special blue-flame burner consumes partly air and can be lighted instantly.

The weight of this heater is about 40 lbs. It is equipped with a pair of substantial handles, making it easy to move about. Water circulates the same as in the gas heater, and the flame is also screened to prevent explosion or fire. The price is \$25.

The Neverout Gas Heater

This type of radiator heater is designed to be operated from the city gas supply and attaches to the car's cooling system as do



Showing the Neverout Gas Heater Attached to Water-Circulating System of Engine

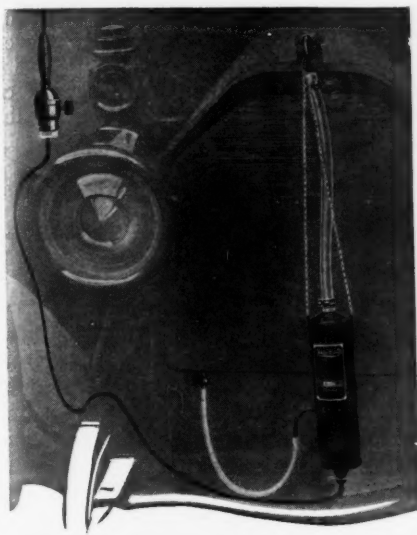
the other two styles, namely—by hooking the tube of the device into the auto radiator filler opening, and connecting the heater circulating system with the auto radiator drain cock by means of a small rubber tube. The burner of the heater is connected to the gas supply by a flexible metallic tube.

It keeps the water warm and also heats the garage, as well as making starting the next morning easy. The hot water reaches not only the upper part of the radiator immediately, but by conductivity the heat is conveyed through the water-jacket, etc., even though there is a pump. The gas flame is entirely surrounded by a safety screen, which is claimed to effectually prevent com-

munication with the surrounding atmosphere and thereby eliminate all danger of fire. When not in use it can be hung on any convenient hook in the garage wall. The hooked tube does not bear the strain of the weight of the device, this weight being carried by a chain attached to the hook at one end and the heater at the other. A bracket also be had. The price is \$20.

The Electric Heater

This electric type of radiator and garage heater can be operated from any light socket where current is available and it furnishes a safe and ideal method for keeping the engine warm. Circulation of the water is the same as in the other heaters, it being taken from the bottom of the



Showing Neverout Electric Heater Attached to Water-Circulating System of Engine

radiator, passing through the heater, and then returned through the tubing hooked into the radiator filler opening.

The heater can be used on 100 to 125-volt circuits. Direct or alternating current consumes from 500 to 600 watts per hour. Requires 5 amperes. Furnished for 200-volt circuits where desired. Smaller heater can be used on 100 to 125-volt circuits; consumes from 250 to 300 watts per hour. Requires 3 amperes. The price is \$15.

ELECTRIC ENGINE WARMER

With the rapidly increasing use of the gasoline automobile during the winter months, chilled engines and frozen radiators are the most serious problems of the private garage owner. Efforts to solve this problem led to the invention of an electric engine radiator warmer which is simply screwed into any lamp socket in the garage and placed down in the hood of the car between the engine and the radiator. The body of the heater contains a rugged heating element which consumes one-tenth of a kilowatt, less than one cent an hour, and is said to give off just enough heat to keep the radiator from freezing and the engine

from causing starting trouble. This heating element is enclosed in a black enamel metal shell, shaped like and about the size of an ordinary dry cell, which is perforated



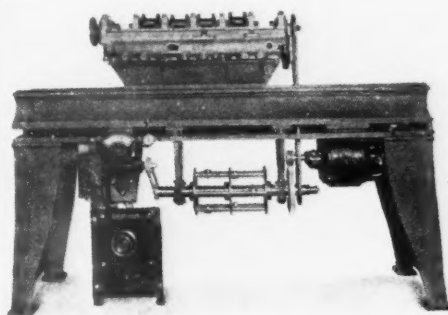
The Electric Engine Warmer

This device is attached to any lamp socket and is placed under the hood, as shown in the illustration. In severe weather it is necessary to blanket the hood to retain the heat and facilitate starting.

to allow for circulation of the heated air from within. The entire outfit is insulated, fire-proof, weighs less than a pound, and comes with 10 ft. of cord. It is manufactured by the Hughes Electric Heating Co., 215 W. Schiller Street, Chicago, Ill.

DYNAMIC BALANCING MACHINE

Dynamic balance is a part of mechanics of engineering and not merely a shop method. The problem is said to be perfectly capable of a definite solution if proposed in a rational manner and treated along rational lines. The importance of running balance in high speed machinery is well understood. N. W. Akimoff, en-



The Dynamic Balancing Machine

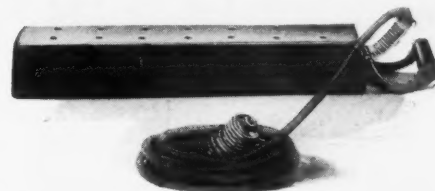
The above illustration shows a test being made to determine the dynamic balance of an automobile engine crankshaft.

gineer of the Dynamic Balancing Machine Co., Philadelphia, Pa., has devised a machine for correcting the condition of dynamic unbalance. It is imperative that a machine to deserve the name of dynamic balancing machine absolutely must indicate the plane of unbalance, as well as the numerical value and sign of the unbalancing couple. The designer claims that this machine covers these conditions. The following is a brief description of the machine: A rigid horizontal beam is hinged at one end and supported by a spring at

the other. The body to be tested, already in perfect static balance, is rotatably supported on the beam. If dynamically unbalanced, the body will, when rotated, cause the beam to vibrate in a vertical plane with a period of oscillation equal to the period of rotation of the body. In other words, if the speed of the unbalanced body is 315 r.p.m. the beam will vibrate at the rate of 315 complete oscillations per minute quite regardless of the characteristics of the spring. A second body, exactly similar in every respect to the first, also in perfect static balance but dynamically unbalanced to precisely the same extent as the first body, is temporarily associated with the same beam and suspended under it. If these two bodies are oppositely located as to balance and run precisely at the same speed (synchronously) then the unbalancing or disturbing couples will cancel out, and the beam will have no tendency to vibrate, no matter how badly unbalanced, individually, are the two bodies. This is the fundamental principle of the machine; to determine unbalance by determining the unbalance necessary to neutralize its effect. The second body is actually a so-called squirrel cage which consists of two or more circular discs, carrying an even number of rods arranged slidably in the discs. The rods are accurately made and their common weight is known, therefore any displacement of one of the rods with respect to the one exactly opposite will not effect the static balance, originally perfect, of the cage, but will introduce a certain centrifugal couple, according to the relative displacement or added distance. Application of these principles to actual practice of balancing permits of definitely establishing the plane and sign, and of estimating the exact numerical value of the centrifugal couple of the body.

KONSRV HEATER FOR ENGINE AND RADIATOR

This is known as the No. 1 Engine and Radiator Heater and is made by the Konserve Electric Co., of 2041 East 3rd St., Cleveland, O.; price, \$5. It is used connected to a 110 volt circuit and therefore for garage use only. A No. 2 Heater can be had for \$7.50, adaptable to either 100 volt current or the 6 volt current from the car battery. The current used is about 100



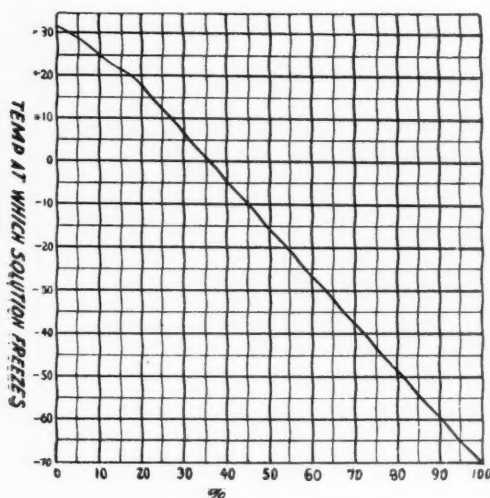
Konsrv Engine and Radiator Heater

Operative by connecting to electric light current. No. 2 can be connected to 110 volt circuit or the car's battery.

watts per hour and the heater is claimed to keep all things under the hood warm in cold weather. The maker states the approximate cost of operation per month is \$1.50. Model No. 2 can be attached to the car permanently if desired. The finish is black enamel. The price includes 10 ft. of cord.

THERMITE

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Thermite Freezing Chart

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OPCO RADIATOR OIL

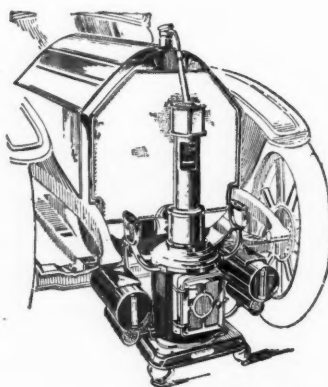
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The Oil Heater

This type heater burns kerosene commonly called headlight or coal oil. The capacity is 2 gallons, which will burn from 36 to 48 hours with one filling, according to the size of flame. This large capacity



Showing Neverout Oil Heater Attached to Water-Circulating System of Engine

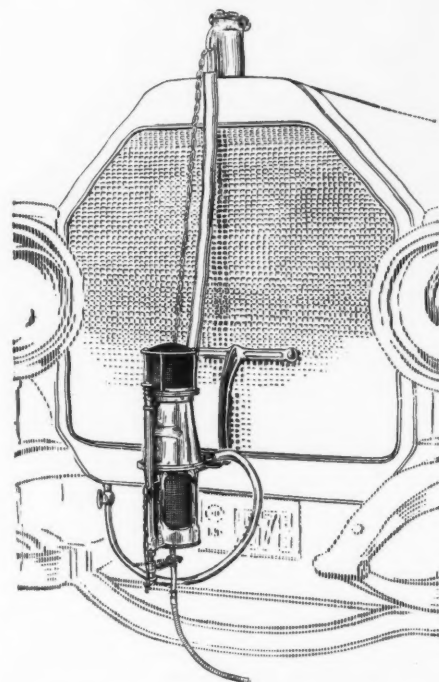
makes it possible for the automobilist to let his car stand for a considerable length of time, practically two days, the gages on the front of the tanks plainly showing how much oil is available at all times.

The tanks, which have been divided so that they hold one gallon each, are conveniently placed on either side of the heater in order to balance same. This permits the filling of the tanks separately. It must be noted that the tanks can be refilled without extinguishing the flame, as the sub-tanks at the lower part of the main tanks contain enough oil to burn while the upper tanks are being refilled. The special blue-flame burner consumes partly air and can be lighted instantly.

The weight of this heater is about 40 lbs. It is equipped with a pair of substantial handles, making it easy to move about. Water circulates the same as in the gas heater, and the flame is also screened to prevent explosion or fire. The price is \$25.

The Neverout Gas Heater

This type of radiator heater is designed to be operated from the city gas supply and attaches to the car's cooling system as do



Showing the Neverout Gas Heater Attached to Water-Circulating System of Engine

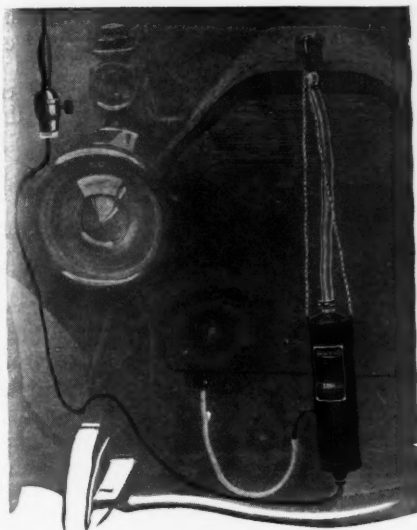
the other two styles, namely—by hooking the tube of the device into the auto radiator filler opening, and connecting the heater circulating system with the auto radiator drain cock by means of a small rubber tube. The burner of the heater is connected to the gas supply by a flexible metallic tube.

It keeps the water warm and also heats the garage, as well as making starting the next morning easy. The hot water reaches not only the upper part of the radiator immediately, but by conductivity the heat is conveyed through the water-jacket, etc., even though there is a pump. The gas flame is entirely surrounded by a safety screen, which is claimed to effectually prevent com-

munication with the surrounding atmosphere and thereby eliminate all danger of fire. When not in use it can be hung on any convenient hook in the garage wall. The hooked tube does not bear the strain of the weight of the device, this weight being carried by a chain attached to the hook at one end and the heater at the other. A bracket also be had. The price is \$20.

The Electric Heater

This electric type of radiator and garage heater can be operated from any light socket where current is available and it furnishes a safe and ideal method for keeping the engine warm. Circulation of the water is the same as in the other heaters, it being taken from the bottom of the



Showing Neverout Electric Heater Attached to Water-Circulating System of Engine

radiator, passing through the heater, and then returned through the tubing hooked into the radiator filler opening.

The heater can be used on 100 to 125-volt circuits. Direct or alternating current consumes from 500 to 600 watts per hour. Requires 5 amperes. Furnished for 200-volt circuits where desired. Smaller heater can be used on 100 to 125-volt circuits; consumes from 250 to 300 watts per hour. Requires 3 amperes. The price is \$15.

ELECTRIC ENGINE WARMER

With the rapidly increasing use of the gasoline automobile during the winter months, chilled engines and frozen radiators are the most serious problems of the private garage owner. Efforts to solve this problem led to the invention of an electric engine radiator warmer which is simply screwed into any lamp socket in the garage and placed down in the hood of the car between the engine and the radiator. The body of the heater contains a rugged heating element which consumes one-tenth of a kilowatt, less than one cent an hour, and is said to give off just enough heat to keep the radiator from freezing and the engine

from causing starting trouble. This heating element is enclosed in a black enamel metal shell, shaped like and about the size of an ordinary dry cell, which is perforated



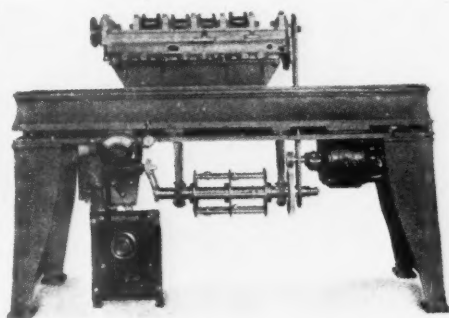
The Electric Engine Warmer

This device is attached to any lamp socket and is placed under the hood, as shown in the illustration. In severe weather it is necessary to blanket the hood to retain the heat and facilitate starting.

to allow for circulation of the heated air from within. The entire outfit is insulated, fire-proof, weighs less than a pound, and comes with 10 ft. of cord. It is manufactured by the Hughes Electric Heating Co., 215 W. Schiller Street, Chicago, Ill.

DYNAMIC BALANCING MACHINE

Dynamic balance is a part of mechanics of engineering and not merely a shop method. The problem is said to be perfectly capable of a definite solution if proposed in a rational manner and treated along rational lines. The importance of running balance in high speed machinery is well understood. N. W. Akimoff, en-



The Dynamic Balancing Machine

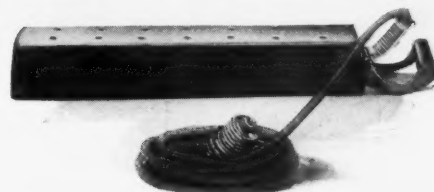
The above illustration shows a test being made to determine the dynamic balance of an automobile engine crankshaft.

gineer of the Dynamic Balancing Machine Co., Philadelphia, Pa., has devised a machine for correcting the condition of dynamic unbalance. It is imperative that a machine to deserve the name of dynamic balancing machine absolutely must indicate the plane of unbalance, as well as the numerical value and sign of the unbalancing couple. The designer claims that this machine covers these conditions. The following is a brief description of the machine: A rigid horizontal beam is hinged at one end and supported by a spring at

the other. The body to be tested, already in perfect static balance, is rotatably supported on the beam. If dynamically unbalanced, the body will, when rotated, cause the beam to vibrate in a vertical plane with a period of oscillation equal to the period of rotation of the body. In other words, if the speed of the unbalanced body is 315 r.p.m. the beam will vibrate at the rate of 315 complete oscillations per minute quite regardless of the characteristics of the spring. A second body, exactly similar in every respect to the first, also in perfect static balance but dynamically unbalanced to precisely the same extent as the first body, is temporarily associated with the same beam and suspended under it. If these two bodies are oppositely located as to balance and run precisely at the same speed (synchronously) then the unbalancing or disturbing couples will cancel out, and the beam will have no tendency to vibrate, no matter how badly unbalanced, individually, are the two bodies. This is the fundamental principle of the machine; to determine unbalance by determining the unbalance necessary to neutralize its effect. The second body is actually a so-called squirrel cage which consists of two or more circular discs, carrying an even number of rods arranged slidably in the discs. The rods are accurately made and their common weight is known, therefore any displacement of one of the rods with respect to the one exactly opposite will not effect the static balance, originally perfect, of the cage, but will introduce a certain centrifugal couple, according to the relative displacement or added distance. Application of these principles to actual practice of balancing permits of definitely establishing the plane and sign, and of estimating the exact numerical value of the centrifugal couple of the body.

KONSRV HEATER FOR ENGINE AND RADIATOR

This is known as the No. 1 Engine and Radiator Heater and is made by the Konsrv Electric Co., of 2041 East 3rd St., Cleveland, O.; price, \$5. It is used connected to a 110 volt circuit and therefore for garage use only. A No. 2 Heater can be had for \$7.50, adaptable to either 100 volt current or the 6 volt current from the car battery. The current used is about 100



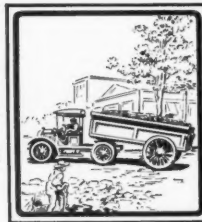
Konsrv Engine and Radiator Heater

Operative by connecting to electric light current. No. 2 can be connected to 110 volt circuit or the car's battery.

watts per hour and the heater is claimed to keep all things under the hood warm in cold weather. The maker states the approximate cost of operation per month is \$1.50. Model No. 2 can be attached to the car permanently if desired. The finish is black enamel. The price includes 10 ft. of cord.



TRAILER DEPARTMENT



TRAILER MAKERS FORM ORGANIZATION

A meeting of trailer manufacturers for the purpose of effecting a permanent organization, was held in the Statler Hotel, Detroit, Mich., October the 10th. The preliminary meeting was presided over by C. W. Shipley, president of Sechler & Co., Cincinnati, Ohio, and the regularly organized meeting by A. A. Keesler, president of the Watson Wagon Co., Canastota, N. Y. The following companies were represented:

Detroit Trailer Co., Detroit, Mich.; Fox Trailer Co., Windsor, Ont.; Service Auto Trailer Co., Detroit, Mich.; Rochester Trailer Co., Rochester, N. Y.; Warner Mfg. Co., Beloit, Wis.; Rogers Bros. Co., Albion, Pa.; Los Angeles Trailer Co., Los Angeles, Cal.; Martin Rocking Fifth Wheel Co., Springfield, Mass.; Jahns Semi Trailer Co., Detroit, Mich.; Troy Wagon Works Co., Troy, Ohio; The Sechler & Co., Cincinnati, Ohio; Watson Wagon Co., Canastota, N. Y.; Miami Trailer Co., Troy, Ohio; Ohio Trailer Co., Cleveland, Ohio.

After a rather full discussion of the question effecting a permanent organization it was the opinion of those present that such organization should be effected, and immediate action in this direction was taken with the result that "The Trailer Manufacturers' Association of America" was unanimously adopted as a suitable name for the organization. The officers elected were:

President—C. A. Geiger, president of the Troy Wagon Works Co.

Vice-president—Miss Kate Gleason, secretary of the Rochester Trailer Co.

Vice-president—A. P. Warner, of the Warner Mfg. Co.

Secretary-treasurer—J. C. Endebrock, secretary of the Sechler & Co.

The executive committee to be composed of the four officers of the organization and three additional members, in the persons of S. A. Griggs, of the Detroit Trailer Co.

A. A. Keesler, president of the Watson Wagon Co.

James E. Britton, of Rogers Bros. Co.

There were open discussions of a number of questions very important to the trailer industry. The first one was on the matter of Publicity and Education, which is really the keynote of the organization.

It was the consensus of opinion that what the trailer industry needs most right now is a wide campaign of publicity and education in the principles and advantages of trailer-hauling. Those present were favored with a talk by George B. Russel, of the Russel Motor Axle Co., of Detroit,

Mich., who, on account of his direct connection with the Internal Gear Drive Association and its publicity and educational campaign pertaining to internal gear drive axles, was well qualified to speak on the subject under discussion. Mr. Russel stated that the campaign inaugurated and carried on by the Internal Gear Drive Association resulted in very excellent results and contributed not a little toward the great success which the internal gear drive axle has met with in the past two years. Mr. Russel outlined somewhat the plan under which their campaign was conducted.

It was decided that the Association enter on a general campaign of publicity and education along the lines discussed.

The matter of shows and exhibits was also canvassed. The question as to whether demonstrations were necessary in the making of sales was also briefly dealt with, the sentiment generally being against demonstrations. There was also a comparison of sales policies and methods by which trailers are being introduced.

It was a most enthusiastic meeting and was the best evidence that we have had up to the present time that the trailer industry has arrived. The meeting was very well attended and the amount of enthusiasm displayed and backed up by actual business done augurs well for the trailer industry.

TRAVELING MACHINE SHOP KEEPS AERO SQUADRON IN COMMISSION

Military service is especially hard on engines and other mechanical parts of a flying machine, and because it takes but little to throw one of these winged navigators of the air out of commission a very active and mobile repair department must be kept up.

In the small, traveling machine shop maintained by the Aero Squadron of the U. S. Army, there is an electric generator driven by truck power. This manufactures the current for lights and power to run ma-

chinery. The shop is equipped with a small lathe driven by an individual motor.

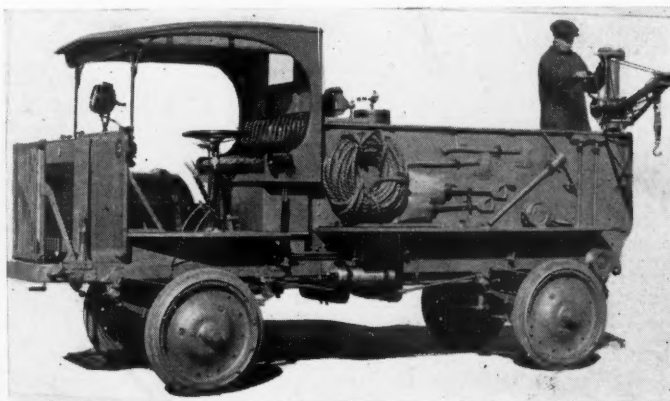
This lathe has all the tools and attachments necessary for all kinds of work. Also there is an emery wheel and drill press, each driven by individual motors, while an indexed cabinet contains a complete set of tools especially adapted to the repair of aeroplanes.

The whole outfit is housed in a closed body with folding sides. When preparing for work these sides are folded down even with the floor of the truck and used as a floor for the machine operatives. All of these portable machine shops in use in the U. S. Aero Squadron are mounted on Jeffery Quad trucks.

MATCO TRAILERS TO BRING OUT COMPLETE LINE

Michigan Auto Trailer Co. announces a complete line of trailers, both two-wheel and four-wheel, ranging in capacity from ½-ton to 5-ton, the larger models to be placed on the market in the near future. Heretofore the demand for the ½-ton and 1-ton jobs has been so great as to require the whole of the company's manufacturing facilities. The Matco trailer is a distinct departure from ordinary trailer construction which has followed the lines of the common wagon body rather than that of the motor car. F. G. Osborne, the sales director of the company, early realized that a trailer was called upon to perform a duty at least as heavy as that required of the truck—perhaps even heavier in many instances—and that consequently the sturdiest possible construction throughout was necessary if the trailer was to stand up in the service for any length of time.

T. G. YOUNG, 601 Pine Street, Seattle, Wash., will handle the entire line of motor truck trailers for Washington and Alaska.



Jeffery Quad Wrecking Outfit

This truck is equipped with all apparatus necessary for making road repairs to motor truck trains now in service in Mexico.

Duplex Four-Wheel Drive With Aggregate Load of Twenty Tons

Two-ton Duplex four-wheel drive truck hauling fourteen-ton load of sugar beets on three trailers. Aggregate weight of trailers and load is twenty tons.



GMC Truck With Special Trailer

A two-ton GMC truck is used with a special trailer at Elma, Wash., to carry baled hay. It has nearly doubled its capacity in this way. The trailer is equipped with huge wagon wheels for the rough country roads over which the truck is forced to pass in its work in that section of the State.

Eighteen Tons of Feed on a Pair of Trailers

By a correct distribution of weight the unusual load of eighteen tons is carried on two trailers, with less weight per inch on the tire surface than is produced by a five-ton load on the four wheels of an average truck of that capacity. The illustration shows a Knox Model 35 tractor hauling two trailers for the Los Angeles Creamery Company, the load of eighteen tons of alfalfa meal being carried by five axles and ten wheels.



Troy Trailer in Use With Brewer's Truck

This outfit is owned and operated by Jacob Ruppert, brewer, of New York City. The truck is a Mercedes five ton, and the trailer a Troy 512 reversible type, capacity five tons; tires 36 x 7 in., Goodrich



The Arrival of a 160 H.P. Aeroplane at the Border, It Being Entirely Boxed and Hauled on Jeffery Quads and Trailers

Interesting and helpful information; reputable advertisements—that's the CCJ

CHILTON TRACTOR JOURNAL

Many Uses Found for Tractors on the Farm

By WARREN EUGENE CRANE

TRACTORS are coming into general use of the big farms of the Northwest. A Bull Tractor used in an alfalfa field on the Parish farm near North Yakima plowed six acres to a mean depth of 7 in. in eight hours' time. At another farm five miles away from the Parish place a tractor was attached to a 16 in. ensilage cutter with a 40 ft. elevator running to the top of silo. They started in the morning with the 15 gallon tank filled and plowed up the farm, cut forty tons of ensilage and elevated it to the top of the silo by 4 P. M., when the gasoline supply was exhausted. The gasoline tank was then refilled with

plows through a 12 acre field, cultivating an average on one acre an hour.

Near Burlington, Wash., a Bull Tractor was placed in operation in an exceedingly hard pasture which had not been turned over in five years. It pulled a 14 in. two bottom gang plow and plowed the field efficiently. Other practical uses for the tractor about the farm are in hauling, stacking and storing hay and grain. Through its use in towing and by means of belt attachments, it can be utilized to operate threshing machines, silage cutters and other farm appliances.

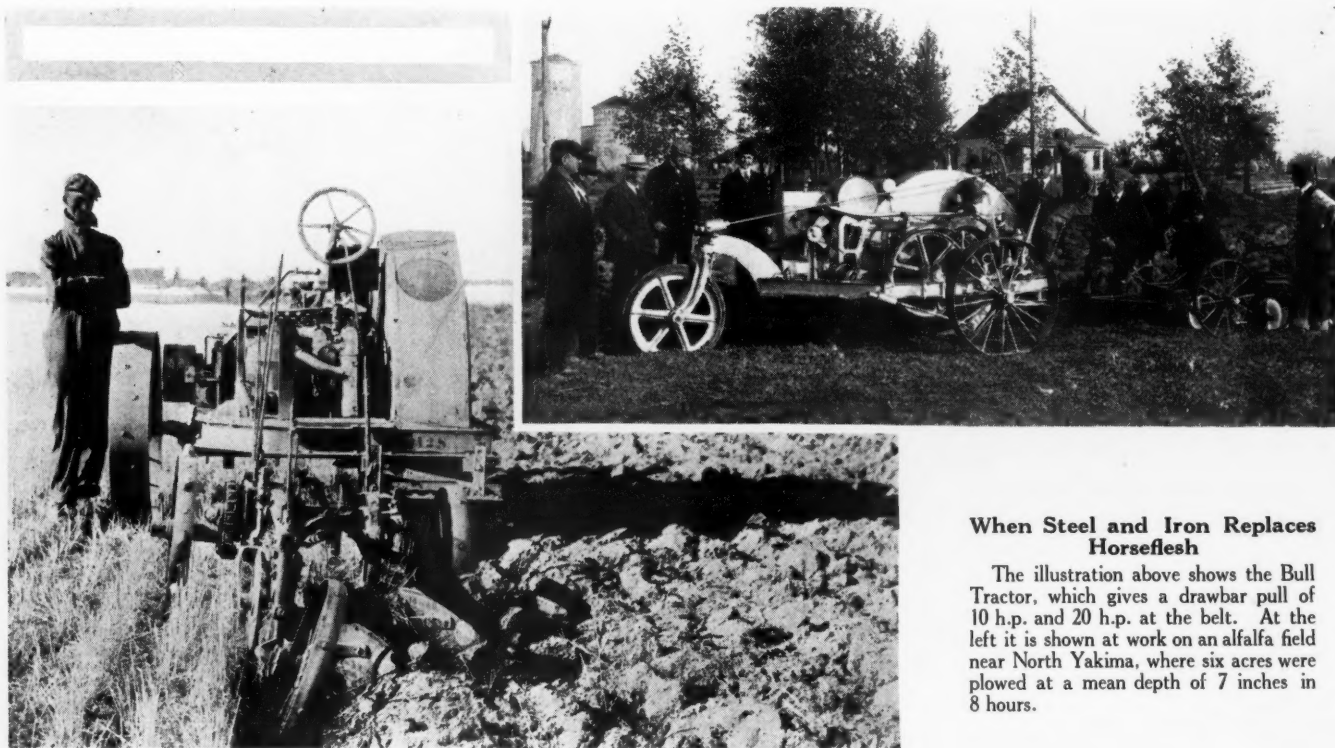
Railroad builders and contractors have found the tractor of particular advantage as

Washington. H. H. Harwood, of the company, claims that horses are gradually being displaced on the large farms of the Northwest by the tractor, because they are less expensive to operate and do not require as much room as horses and agricultural implements of the old type.

TRACTOR PLOWS AN ACRE AT COST OF \$1.60

One acre of ground can be tractor plowed 6 in. deep on 2¼ gallons of kerosene and ⅛ gallon of lubricating oil.

This was demonstrated in a two-day tractor plowing test conducted recently at Iowa



When Steel and Iron Replaces Horseflesh

The illustration above shows the Bull Tractor, which gives a drawbar pull of 10 h.p. and 20 h.p. at the belt. At the left it is shown at work on an alfalfa field near North Yakima, where six acres were plowed at a mean depth of 7 inches in 8 hours.

distillate and the filling of the silo was completed by 7 P. M., with a total cut of 90 tons of ensilage for the day.

On one of the big ranches near Davenport, Wash., the tractor plows an average of an acre an hour in stubble fields that have grades as high as 20 per cent. in many places. They still retain the services of six horses and a plow, which are always left behind by the swift-moving tractor.

On a ranch near Reardon, Wash., they report that their tractor drew two 14 in.

a road locomotive. While it is necessary to grade a road for them, there is very little work involved when compared with that required to lay tracks upon which a locomotive and dump cars can run. In fact, the road for the tractor does not need to be any better than the field surface over which it operates in farming.

The Northwest Buick Co., of Seattle and Spokane, is using the tractor in raising the poles and canvas of the tent which they are using in displaying their line of cars and tractors throughout the State of

State College by the agricultural engineering department. The complete results of the test represent probably the most comprehensive data on tractor plowing operations that have been worked out by any college.

It took one hour and seventeen minutes to plow an acre. The length of furrows was 548 feet. Dead furrows were 300 feet apart. Because of the shortness of the field one-sixth of the time was spent in turning.

The CHILTON ideal—honest circulation; results to advertisers—fully exemplified in the CCJ

A Case tractor pulling three 14 in. Grand Detour plows was used. The average rate of speed was 2.25 m.p.h.; average draw bar pull 1,677 lbs.; horsepower developed 10.66. It took ten hours and twenty-four minutes to plow 8.14 acres. The field was level.

The total cost of plowing an acre is figured at \$1.60. This is figured on the basis of kerosene costing 10 cents a gallon, lubricating oil 32 cents a gallon, operator's time, 50 cents per hour; interest, depreciation and repairs, 69.8 cents per acre.

On a longer field the tractor would have made a better showing with corresponding reduction in unit cost per acre. Moreover, most farmers would figure the operator's wages less than here estimated.

ment consisted of one Model 36 Knox tractor with five-ton ore body and two five-ton Troy trailers, equipped with regular steering apparatus, roller bearings and 36 x 7-in. rubber tires.

Traffic was never interfered with in any manner, on account of the fact that the tractor could pass as easily as the ordinary automobile. The tractor was equipped with steel wheels 14 in. wide, which were fitted with diagonal cleats. After the eleven trips up and down the canyon, no appreciable wear was noticeable on the tires. Some of the demonstrations were made during heavy rainstorms and no difficulty in negotiating the trip was experienced at any time.

The total tonnage of ore hauled during these eleven demonstrations was 272,660

lbs., and although coal was not taken back on every return trip a total of 27,080 lbs. of coal was hauled back from the valley up to the mines. The amount of coal hauled per trip ranged from 3600 to 4300 lbs.

An average gas consumption of 21 gals. per round trip was registered and the round trip consumption of oil averaged 2 qts. Two trips were made every twenty-four hours, the average time coming down being 3½ hours, which with allowing one hour for loading and unloading, gave three hours for oiling, taking on gas and inspecting the machine.

During the trip a rise 3050 ft. is negotiated in a distance of 16 miles, seven of which are across the valley. The company which has the contract for hauling ore from the Cardiff mines to the smelters reports the utmost satisfaction with the performance of the tractors. Their records show an average of twenty tons of ore per tractor each trip and the company states that the schedule of the trips does not vary seven minutes.

A. C. MICHEL, of Chicago, and a number of other business men of that city, who are stockholders in the Bullock Tractor Co., have secured 2,000 acres of land in Schoolcraft county, Mich., and will demonstrate tractors in farming operations. Practically all of the work on the farm of every character will be done by motor power.



A Disabled British "Tank"

Showing one of the first authentic pictures of the Caterpillar armored tractors used by the British army on the Somme front in France. The illustration shows the rear of the machine. The large wheels do the steering and support the weight of the tractor when crossing a shell crater or trench, thus greatly increasing its mobile length. The machine has been damaged, as one of the tractor belts which provide traction is torn out of position as shown at the right.

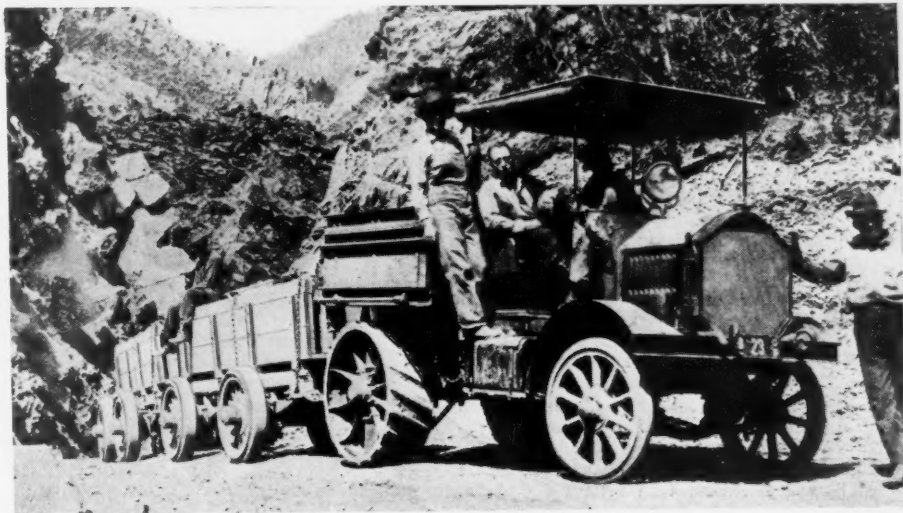
TRACTOR AND TRAILER SETTLE MINE'S HAULAGE PROBLEM

The Utah-Idaho Motor Co., of Salt Lake City, Utah, proved conclusively to the officials of the Cardiff Mines, as well as to the company contracting to haul the ore from the mines to the smelters in the valley and coal and other supplies back to the mines, that Knox tractors would do the work in a manner that would forever settle the transportation problem for all concerned, after demonstrations that left no room for doubt in the mind of anyone who witnessed them.

Hundreds of teams were formerly employed at a great expense to haul the ore from the mine down the canyon.

The demonstrations were in charge of L. D. Stone and eleven trips were made from the ore bins of the Cardiff mines in Big Cottonwood Canyon to the smelters in Salt Lake valley.

Following is a brief synopsis of results of these eleven demonstrations. The equip-



Knox Model 36 Tractor Hauling Ore for the Cardiff Mining Interests



Walker Electric Tractor With Ten-Ton Load Including Trailers

This is one of a fleet operated by the Bush Terminal Company of Brooklyn and used for hauling from the docks to the warehouses

Everybody who is anybody in the truck industry reads the CCJ

THE "CATERPILLAR" TRACTOR USED FIRST IN PEACE

The adaptation of the caterpillar tractor, for years the foremost piece of farm machinery in America and known far and wide for its universal efficiency, into a relentless engine of war by the Allied armies in Europe, has aroused great public interest. Benjamin Holt, the inventor of the Caterpillar, when asked how his tractor came to be used by the contending armies, gave out the following statement:

"Caterpillar tractors have been in peaceful use in over thirty countries for many years. There were quite a few on Russian estates. A lot of them were in use in Hungary, some in Germany and a few in France and Belgium. When the war broke out all of these were requisitioned by the governments and sent to the battle fronts. Our agent's stock in Budapest was seized by the Austrian army. France shipped in a few that were working on farms in Tunis. The Austrian guns that played such an important part in the capture of Antwerp

were towed by Caterpillar tractors which were commandeered by the German army from our agents. Aviators reported that several of the big tractors owned by our agents in Antwerp were seized by the Germans. Early in the war they took a few from Russia in one of Von Hindenburg's drives. We saw pictures of them in German papers. Austria sent a representative immediately after the opening of hostilities to buy Caterpillars from us, but of course they could not be delivered—England, France and Russia have bought a good many since this, but we supposed that they were being used merely to haul the big guns and keep the road clear, until this last story came out. Since then we have learned that a number of them have been equipped as armored cars.

"Americans," concluded Mr. Holt, "should keep in mind that the number of Caterpillar tractors used in the war is really only a small percentage of those in active service. Over 4,000 of these big Caterpillars are in daily operation in America in works of peace instead of war."

MILWAUKEE LOCOMOTIVE MFG. CO., Milwaukee, Wis., is about to place on the market a new type of gasoline truck tractor. It is intended for the handling of freight at railway terminals, steamship docks and freight houses. Power is supplied by a four-cylinder, vertical, block engine with a bore and stroke of $3\frac{3}{4}$ and $4\frac{1}{2}$ in., power being transmitted through a bevel gear differential and external gear-drive axle. The truck will transport 4000 lbs. on its platform and will haul a trailer load of $3\frac{1}{2}$ tons.

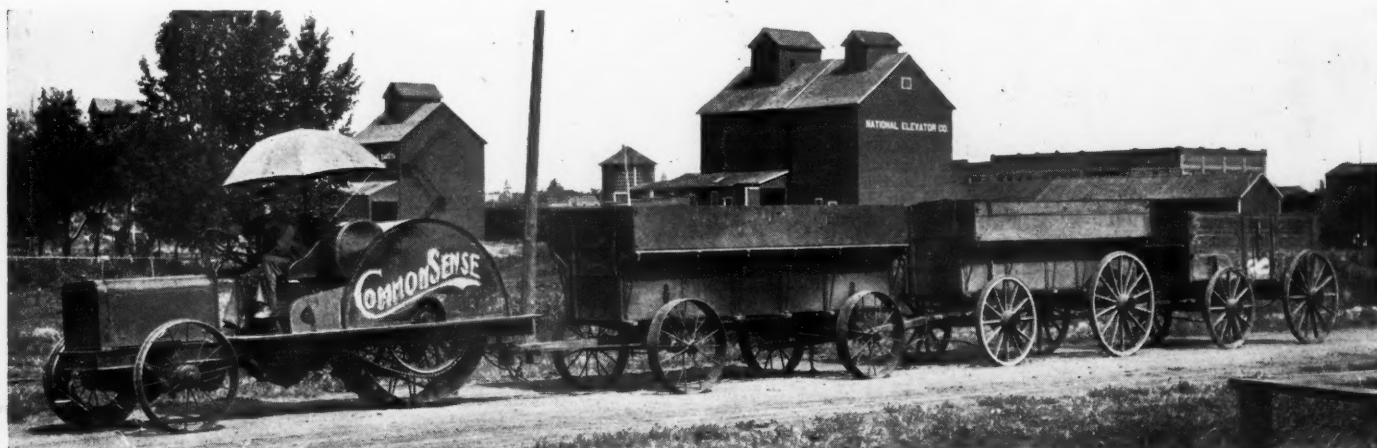
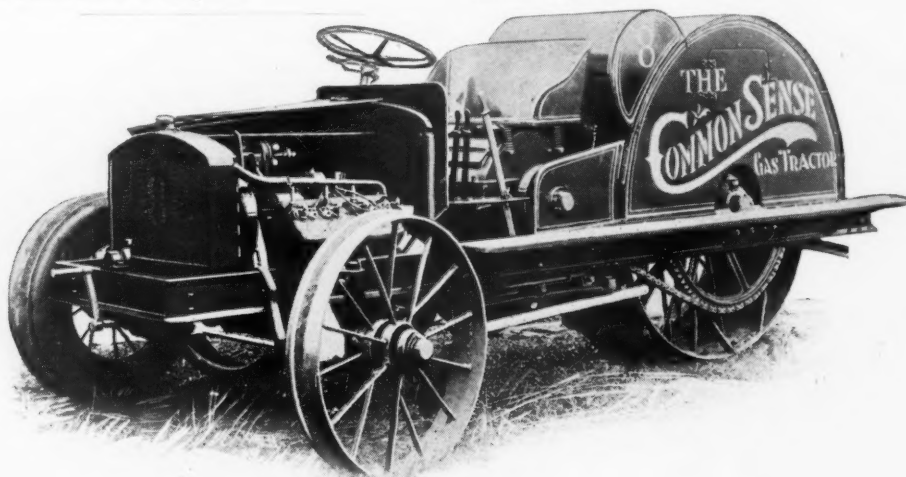


The "Caterpillar" in Times of Peace

Typical scene showing the "Caterpillar" tractor in use on farm land. There is said to be over four thousand of these in use in the United States at the present

Eight-Cylinder Common-Sense Tractor

The Common-Sense Gas Tractor Company, of 622 9th Street, S. E., Minneapolis, Minn., has designed and brought out the eight-cylinder tractor shown herewith. It develops a drawbar pull of 32 h.p. on the three-mile gear ratio, and 50 h.p. on the belt. Details in brief are: Has but two gear reductions; double chain drive, Diamond make; heavy-duty Hyatt roller bearings throughout; Borg & Beck Clutch; Pickering Governor; K-W high-tension ignition and Common-Sense automatic steering device. In a recent test in gumbo this tractor plowed 80 acres 6 in. deep on high at 4 m.p.h., pulling six 14 in. plows. It consumed an average of $1\frac{1}{2}$ gal. of gas per acre.



Plenty of the right kind of circulation means quantity results to advertisers in the CCJ



\$750 Republic Fifteen Hundred Pound "Dispatch" Truck Shows Originality, Especially in Engine Details

TEN thousand trucks of one model for the coming season is the goal of the Republic Motor Truck Co. on the new 1500-lb. "Dispatch."

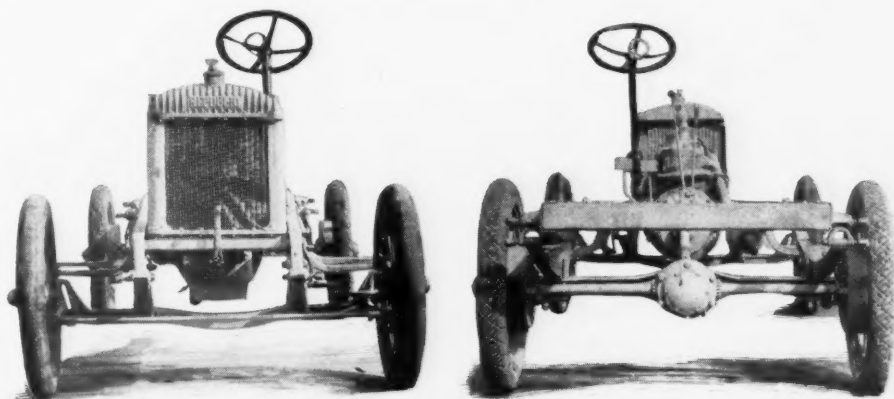
This little vehicle, which is a truck from the ground up, having no converted pleasure car parts in its makeup, is now coming through the factory at Alma, Mich., in quantity, deliveries having begun the first of November. It will represent something less than one-half of the output of this ever increasing plant for the coming year. The new car is replete with novel features, particularly in connection with the engine design. These will be taken up in detail.

Brief Specifications

Aside from the fact that the engine has novel features and that an internal gear axle is used, the rest of the layout follows accepted practice; simplicity is an important item; cylinders are $3\frac{1}{2} \times 5$ in.; radiator armored cast tank type; Marvel carburetor; Bosch high tension magneto; dry disc clutch; three speed sliding gear transmission; shaft drive with two universal joints;

drop forged I-section front axle, Torbensen rear axle; service brakes on rear wheels, emergency brakes on transmission; Jacox worm and nut type steering gear on

left side, 18 in. wheel; center control levers; straight side tapered frame $25\frac{1}{2}$ in. wide at the front, 38 in. wide at the rear, 3-16 in. material, 4 in. deep, 161 in.



Front and Rear Views of the Republic "Dispatch"

It does not matter which way you look at this new fifteen hundred pound truck, the substantial character of it is clearly shown. It sells complete with standard express body and electric lights, everything but starter, for \$750.

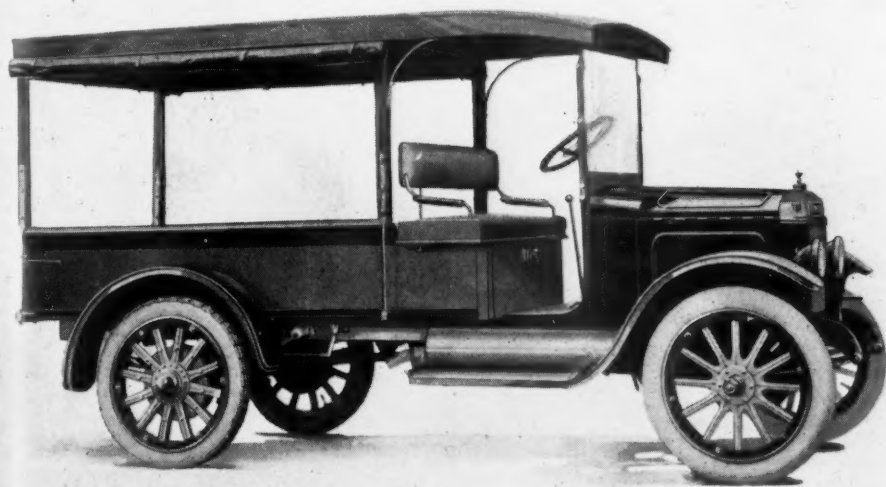
long. The wheelbase is 110 in., tread 56 in., weight with standard equipment 2380 lbs.

Standard Equipment

The car is fitted with glass front, electric horn, electric head and tail lights, Bosch ignition and generator unit with battery as standard equipment. A Bosch starter is supplied, if desired, as an extra.

Novel Engine Features

As the engine contains new features of particular interest, it will be given first attention. It is a unit power plant; the 4 cylinders and the entire crankcase, with the exception of a small pan at the bottom, are all cast integral, which results in practically a one-piece engine, the head, of course, being removable and held by eight studs, and fitted with a gasket. The engine is not mounted by means of integral arms, but by special steel plate constructions, giving rigidity of support in a vertical direction and slight flexibility in the fore and aft direction. The lubricating system is new.

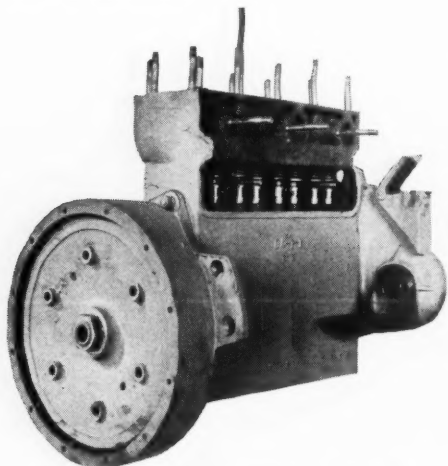


The New Fifteen Hundred Pound Republic "Dispatch" Truck

This latest addition to the Republic line is to be built in quantities, ten thousand going through this year. It is designed for truck purposes and has no converted pleasure car parts. The engine is special throughout and replete with novel features: transmission, sliding gear; internal-gear drive rear axle; price, with express body, canopy top, curtains, glass front, electric lights, etc., \$750.

Merit wins—that's why the CCJ is the leader

The engine is fitted with a special Rugles governor which is the acme of simplicity, being virtually a limited lift poppet valve inserted between the carburetor and the engine; intake pipe cast integral with head, the heat provided giving fuel economy; two bearing crankshaft using very large annular bearings. Gasoline is fed from the dash tank by gravity to a Marvel carburetor.



Side of Engine Casting—Republic "Dispatch"

Showing how much of the construction is cast integral. Valve tappet and valve-stem chamber has an oil-tight cover plate, these parts running submerged in oil. Note the studs for retaining the removable head; also the large opening for filling the case with oil, and the swivel-supported magneto bracket, which provides magneto adjustment.

Taking up these features in order: The accompanying engine illustration shows the cylinders and crankcase cast integral. The sump is a pressed steel pan. A long hand hole plate, retained by 2 studs, covers the valves. The exhaust manifold is held by 3 studs and tapers, the internal diameter increasing toward the rear. The head is cast in a single piece and contains cored intake passages, the lower surfaces of these passages receiving heat from the cyl-

inder combustion chambers, thus vaporizing any fuel which tends to accumulate on the lower side of the passage. The accompanying illustration shows the head removed; the intake passages are shown in dotted lines. The design of these parts permits of a thorough cleaning of the sand from the jackets.

The water connection to the radiator is also a casting held by a single stud. The rear end of the case forms a bell housing surrounding the flywheel and to which the transmission case bolts in the usual manner.

Engine Supports

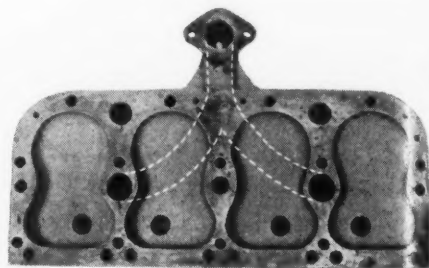
Vertical rigidity with fore and aft flexibility has been obtained by the use of 3-16 in. sheet metal supports stiffened by 1/8 in. plates. These plates stick out vertically from the side frame members, to which they are securely riveted. They support the engine by means of cone shaped openings which fit over integral cast cone shaped extensions on the bell housing, the two being held together by 1/2 in. bolts, washers and nuts. The front is swivel mounted at a single point, providing three point suspension.

The gear case cover at the front is a one-piece casting bolted to the crankcase.

Novel Lubricating System

The oiling system is by forced feed and streams impinging on the rods. The oil from the sump, to which it drains after being strained, is pumped by means of a vertical, hollow steel plunger pump rod with a ball check at the lower end and operated by means of double cam at the center of the camshaft, same acting against a collar on the rod. The oil overflows the top into the compartment in which the

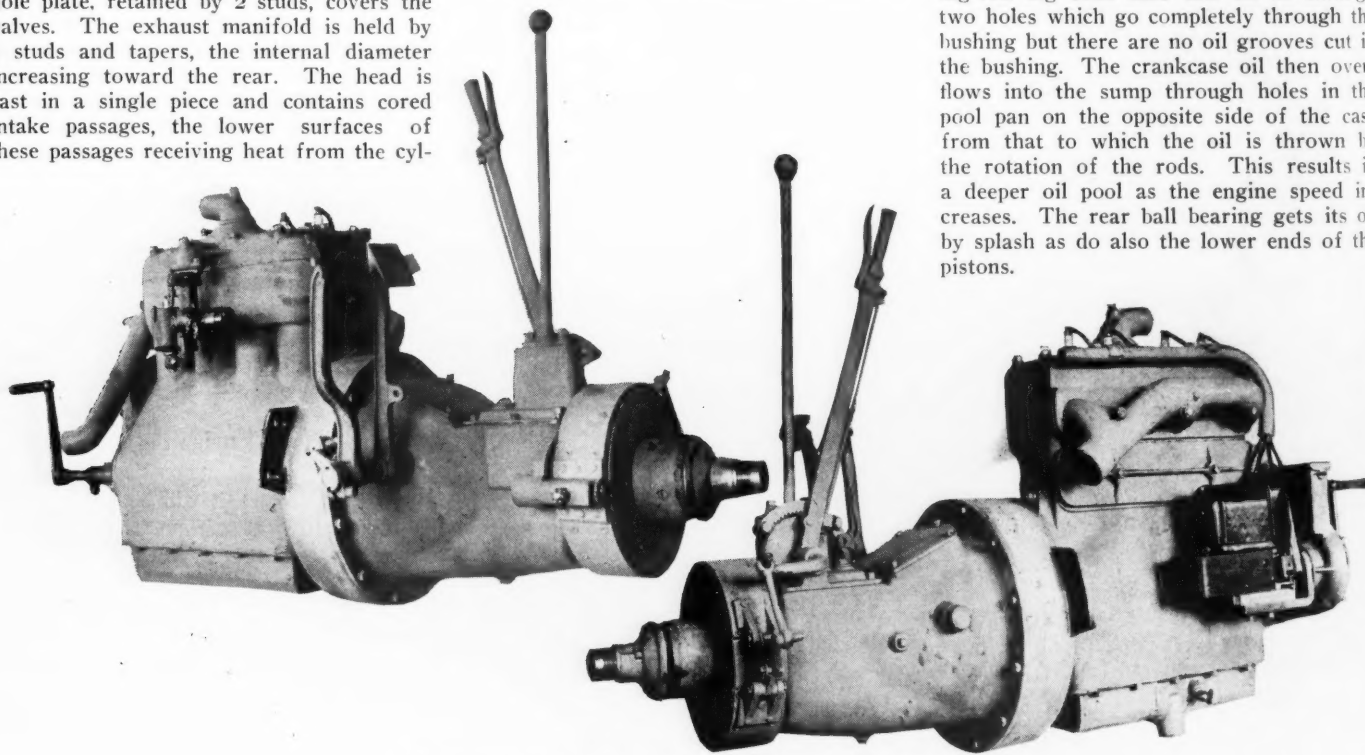
valve stems and springs are housed, so that these operate in a pool. Small holes provide streams of oil which strike the connecting-rods under a head equal to the depth of the oil in the valve lifting chamber. The overflow from this chamber is through a short 1 in. diameter glass tube which is surrounded by a steel tube cut out at diametrically opposite points so that the flow can be observed. This tube is pinched between cork gaskets when the cover of the half time gear case is bolted in place. The overflowing oil runs down over the three spiral half-time gears which have 1 in. face and 6 pitch through the large front crankshaft ball bearing which it lubricates and cleans into a pan beneath the connecting-rod ends forming a



Under Side of Republic Cylinder Heads

Showing in dotted lines the direction taken by the cored intake passages, which, being directly over the cylinder heads, prevent condensation of fuel.

pool. This pan is so shaped that when the engine is tilted upward, as in climbing a hill, the pools are deeper than when on the level. Instead of a scoop, one of the two bolts which holds the connecting-rod cap is prolonged to dip the pool. The connecting-rod big ends take this oil in through two holes which go completely through the bushing but there are no oil grooves cut in the bushing. The crankcase oil then overflows into the sump through holes in the pool pan on the opposite side of the case from that to which the oil is thrown by the rotation of the rods. This results in a deeper oil pool as the engine speed increases. The rear ball bearing gets its oil by splash as do also the lower ends of the pistons.



Right and Left Sides of the New Republic Engine

This unit power plant is described in considerable detail, as it has many novel features. The cylinders and the entire crankcase, except the oil pan, are cast integral. There is practically no external intake manifold, same being cored passages in the removable head. The oiling system is new. Note the combined Bosch generator and magneto on bracket which can be swung, giving magneto adjustment. Attention is also called to the large transmission brake.

The CCJ is built upon the lasting foundation of honest circulation

The use of a two bearing shaft is of course not new; in this case, however, the ball bearings are quite large for a $3\frac{3}{4} \times 5$ in. engine, being numbers 409 and 410. These bearings are but 19 in. apart.

Unusual Magneto Drive

In order to save space, the shaft on one of the half-time gears is hollow. The outer end of the hub slotted and the member which drives the magneto is contained within the hollow shaft, its forward end being forked or armed, while the rear end engages a slot in the magneto drive nut. This piece is shaped like a child's paper doll without a head and made of laminated flexible steel. The arms of the doll engage the slotted hub, the legs of the doll projecting through the hollow shaft, engage the slotted end of the nut on the magneto shaft, thereby providing a flexible drive for it. This arrangement permits the magneto to be placed almost up against the rear of the half-time gears, being the most compact arrangement ever seen by the writer.

Magneto Adjustment by Tilting Bracket

The adjustment of the magneto is unusual and obtained as follows: It is mounted on a bracket which itself is swivel mounted on a prolongation of the hollow steel bearing on which the driving half-time pinion is mounted, as just mentioned in the foregoing paragraph. Adjustment is obtained by swinging the whole bracket and locking it in position by a heavy jam nut. This makes very minute adjustments possible and the method is extremely simple.

The wrist pins are prevented from side slip by a very wide ring around the outside of the piston. The pin is $1\frac{1}{8}$ in. diameter hollow. The big end bearing is $2\frac{3}{8}$ in. long by $2\frac{1}{8}$ in. diameter of die cast babbit S. A. E. specifications. The crankshafts are drop forgings of 40 carbon steel. The camshaft is a one-piece construction. In order to obtain as large bearing surfaces as possible, the gear at the end of the camshaft is keyed to the shaft and the hub of the gear serves as the bearing for the shaft.

The angle of the rear end of the exhaust pipe is such that the pipe is perfectly straight all the way to the muffler. The $8\frac{3}{4}$ gal. gas tank is protected by felt pads. It is made of Terne plate and is

located inside of the dash with a convenient filler cap at one side.

The 14 in. diameter, 60 lb. flywheel, taper, Woodruff key and nut retained, is hollowed out to take the 8 plate dry Raybestos faced 10 in. diameter clutch. Raybestos rings or facings are $8\frac{3}{8}$ in. outside diameter by 1 in. width. The clutch pedal operates a yoke against a ball thrust against a collar on the clutch shaft.

Valves and Push Rods

The lower ends of the push rods are mushroom type and the valves have cast iron heads on steel stems with bevel seat with an opening diameter of $1\frac{3}{8}$ in.

Nothing special need be said about the transmission, which is of Covert manufac-

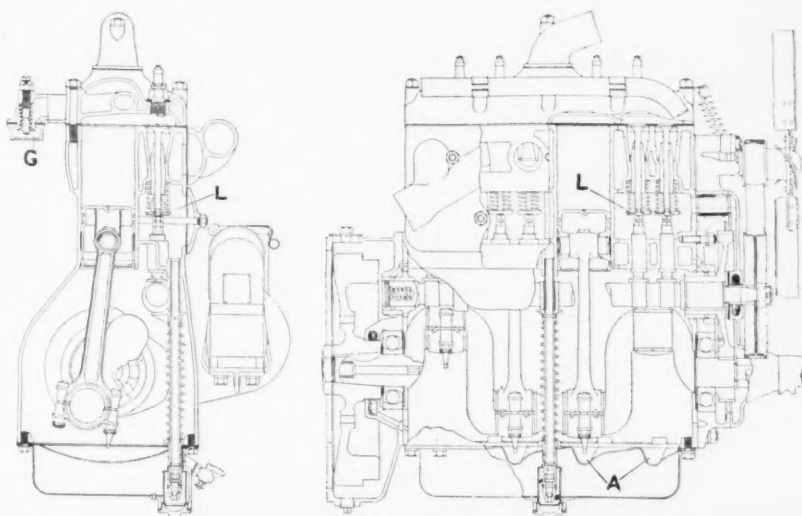
double acting, anchored at the bottom and cam expanded.

Radiator Construction

The radiator also deserves mention, as it is a special Republic construction. It is of the cast rib tank type with flat tube cooling surface; has 5 gal. capacity. The side columns of the radiator, which are also castings, are hollow and act as water columns which equalize the expansion and contraction. Cooling is by thermo syphon system.

Long Springs

The front axle is the usual I-section drop forging with integral spring pads, on which the semi-elliptic springs are mounted



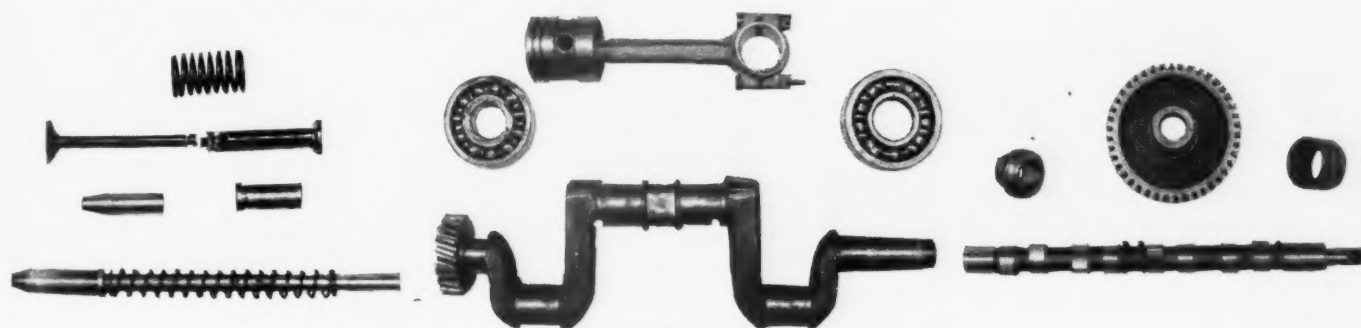
Sectional View of Republic Model 9, Showing Oiling System

At L is shown the level of the oil in the valve tappet chambers, from which, through small holes, streams squirt onto the connecting rods, and from which chamber it also overflows down through a sightfeed glass onto the half time gears, through the main ball bearing at the front into the engine crankcase, where it is caught by the special pan A. The shape of these pockets, as shown, is such that the oil level is deeper going up hill than it is going down hill, the oil being dipped by the prolongation of a bolt in the big end of the connecting rod. For further details, see text.

ture, three speeds forward and reverse, center levers. The drive is by a tubular $1\frac{5}{8}$ in. diameter shaft with two Bowling Green joints to the Torbensen internal gear rear axle. An unusually large contracting band brake of service type, pedal operated, is mounted at the rear of the transmission, and is 10 in. diameter, 3 in. face. The rear wheel brakes are of internal expanding type, 14 in. diameter by 2 in. face, are

and held by $5\frac{1}{8}$ in. nickel steel clips. These springs are $36\frac{1}{2}$ in. center to center, nut and split washer retained. The rear springs are 48 in. long, which is very unusual for a truck of this size. Both springs are shackled at the rear.

The frame length back of the seat is 80 in., height 26 in. The load is approximately 24 per cent. on the front axle and 75 per cent. on the rear. The weight of



Group of Parts of Republic Engine

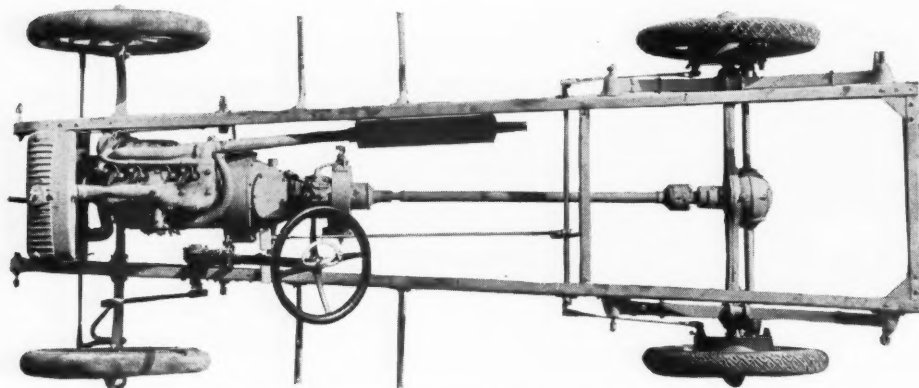
Showing the valve, valve lift rod and spring, and the hollow plunger of the force-feed oiler; at the center, the crankshaft with its large ball bearings, the piston and connecting rod with its prolonged bolt for an oil scoop. The cam shaft with its integral cams, the dual cam at the center for the pump rod, and the half-time gear, the hub of which serves as a bearing, are also shown.

the truck chassis is 2053 lbs. and the wheelbase is 110 in. The wheels are 32 in. diameter fitted with Firestone cushion tires or pneumatics as an option.

The car has a road clearance of 10½ in. and, as mentioned, sells for \$750 with

on two pressed steel hangers. The car has a very businesslike and commercial appearance.

The engine factory has just been completed and the engines are now coming through.



Plan View of Republic "Dispatch"

This new fifteen hundred pound truck is shown with pneumatics, which, however, are optional equipment. Wheelbase is 110 in.; special Republic engine, 3¼ x 5; Torbensen internal-gear drive rear axle. Note the tapered frame and transmission brake.

complete equipment, including body, which is the flareboard or express type with top and side curtains. Lamps are provided with dimming coil and are supported by arms which project from the sides of the radiator. The fenders are of 18 gage metal, crowned and unusually well braced. Short running boards are mounted on each side

Bodies

Various types of bodies may be had, such as express with canopy top or express with solid panel sides. The express body is 81 in. long, 42½ in. wide, 11¼ in. deep, while the height, including canopy, is 54½ in. The solid panel body, which is 81 in. long, 42½ in. wide, 54½ in. high, is \$25 extra.

OBERBERGER DROP FORGINGS

The John Oberberger Forge Co., West Allis, Wis., manufacture a line of drop forgings, embracing crankshafts, connecting-rods, axles, gear blanks, rocker arms, camshafts, valve stems, universal joints, weldless rings, etc. These forgings are made up of carbon or alloy steels and are suitable for the pleasure and commercial car trade. The company has made a careful study of heat treating and specifies that all work shall be micro-photographed as a check. All steels are analyzed so that uniform quality is assured in all cases. Careful consideration is also given to the hammering of all forgings, various sizes of hammers being used, thus assuring the use of tools best suited for the manufacture of the highest grade of drop or steam hammered forgings.

KAURI GUM AND KAURI GUM OIL will be used by the people of Australia and New Zealand to increase their supply of gasoline. Kauri gum is the sap or pitch of prehistoric pines and is found in the swamps of New Zealand. The pure gum is too valuable to be refined for fuel, but from the peat in which it is found can be extracted an inferior grade of the gum. The peat yields from 20 to 30 gal. per ton, of which 25 per cent. can be used for motor fuel, while the rest brings high prices as material for making high-grade varnishes.

The Bourne Magnetic Truck Has Unique Constructional Features

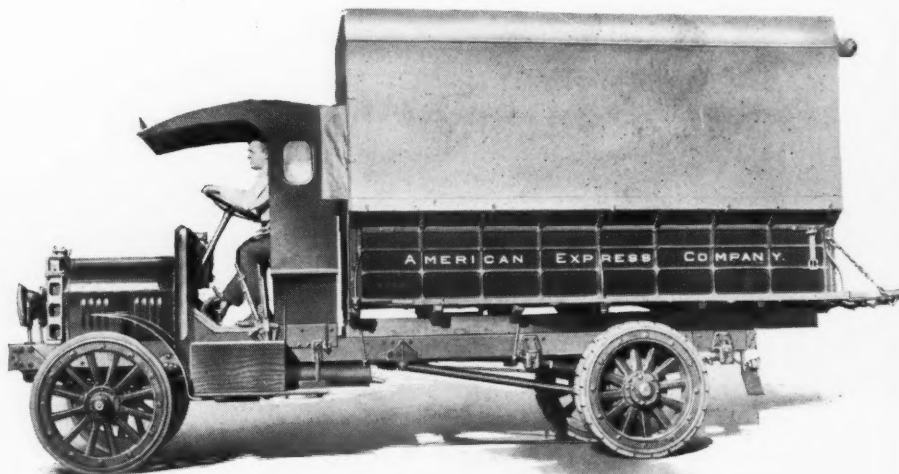
Magnetic Transmission Puts This Truck in Distinctive Class

A FEW years ago when S. N. Bourne, now president of the newly organized Bourne Magnetic Truck Co., Sedgely Ave. at 17th St., Philadelphia, Pa., started building trucks for the exclusive use of the Atlantic Refining Co., in Philadelphia, a precedent was established to build a truck that would do certain work in the most efficient manner possible. From the very beginning no efforts were made to cut down on manufacturing costs, nor was any substituting done in parts or material for the purpose of cutting manufacturing costs. The machine as a whole was built to perform a specific duty and to withstand all the abuses that a commercial car can possibly be subjected to. So successfully have the ideas of the designer worked out that the machine which is now being built for the trade is practically a counter part in design of the first models, with the exception that in the new models the Entz electric transmission is to be used as standard equipment.

This electric transmission, which is the same as that used in the Owen-Magnetic

pleasure car, has been thoroughly tested out in connection with experimental vehicles which have run thousands of miles in the service of the Atlantic Refining Co., delivering oils in Philadelphia and its sub-

urbs and for the American Express Co. of New York City. The great saving in wear and tear noted on the chassis and the substantial economy in operating costs argues well for the adoption of this transmission.



Bourne Magnetic Truck, Which Uses the Entz Electric Transmission

For its readers—information; for its advertisers—results. That's the purpose of the CCJ

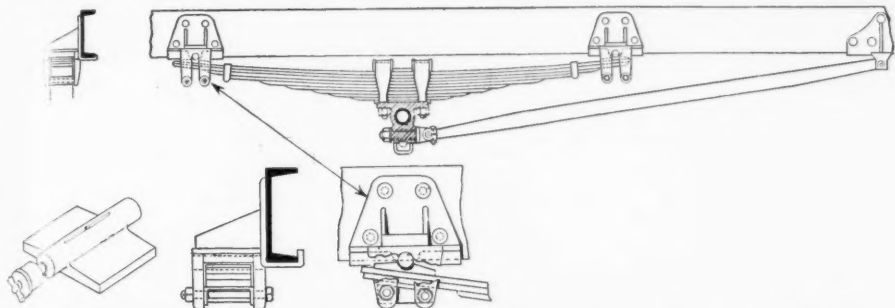
Unusual constructional features are incorporated throughout the machine, the most noticeable being a special spring mounting. Instead of utilizing the conventional shackle a rocking block is used, the squared surface of which rests against the flat end of the longest spring leaf. The rounded head of the rocking block rests in a groove provided for it in a bracket attached to the frame. Actual service has demonstrated that only slight wear is noticeable with this form of construction even though lubricating of the rocking block be neglected. The springs are exceptionally long, 44 x 3 in. front and 60 x 3 in. rear. They are of Mather make.

The frame of this truck as well as the dashboard, driver's seat, fenders and other parts are exceptionally well made. Atten-

The transmission is mounted integrally with the engine. The control of the transmission is on the steering wheel exactly like a throttle lever, while the gasoline engine is controlled by a foot accelerator. A governor is used on both trucks, the smaller being set to 15 m.p.h. and the larger to 12 m.p.h.

The rear axles are of the worm type and carry two sets of inclosed brakes. Besides the mechanically operated brakes, which are operated as usual by pedal and hand lever, the electric brake of the transmission can be utilized whenever the truck is in motion. The electric brake is controlled by a series of switches mounted on the steering column, said switches also controlling the action of the transmission.

Such parts of this truck as the brake



This Illustration Shows the Unusual Spring Mounting on the Bourne Truck, a Rocking Block Being Substituted in Place of the Usual Shackle

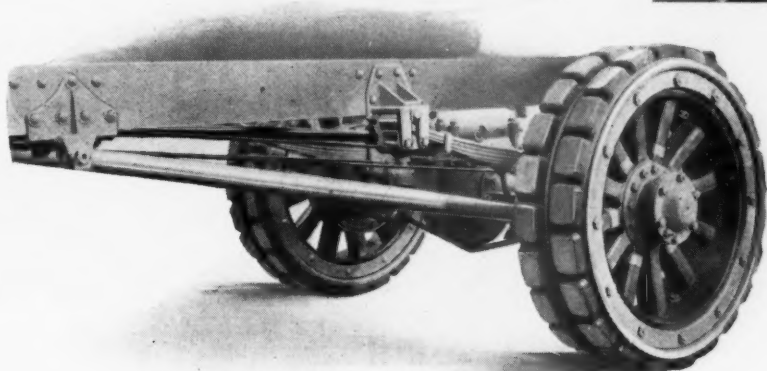
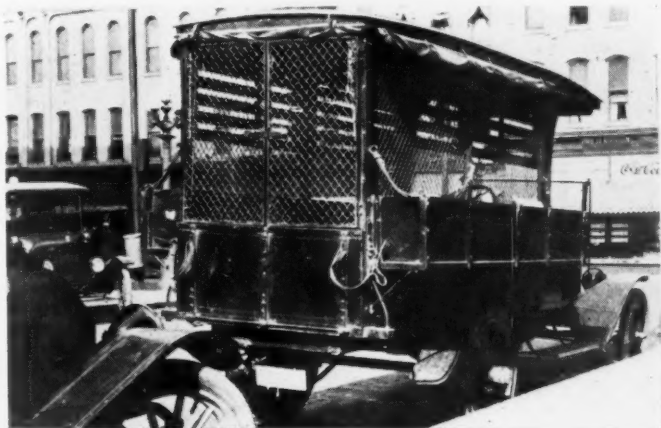
tion is called to the fact that the frame, which is a 6 in. chrome vanadium channel section, is not weakened by the drilling of holes in the flanges, but all cross members are hot riveted to the side member. This method of building the frame permits of a large amount of weaving without loosening the rivets.

Power Plant

The power plant consists of a Hercules engine, 4 x 5½ in. cylinders in the 2 ton model, and 4¼ x 5½ in. in the 3½ ton size. Both engines have five bearing crankshafts and are three-point suspended. The cylinders have individual removable heads. The carburetor is of non-adjustable type, while the ignition is taken care of by a high tension magneto with fixed spark. Starting and lighting is taken care of by the Entz transmission. A feature of this engine is that 90 per cent. of the parts used in the two are interchangeable.

equalizers have also been given special attention. Instead of using the regular bushing to mount these on a novel clamp arrangement is used which can easily be replaced in case of extreme wear. The Bourne Magnetic Truck is built in two sizes, a 2-ton listing at \$3150 and a 3½-ton listing at \$3850.

Carrying Arrangement for Rugs Used on Wurzburg Dry Goods Company's Trucks.



Rear End of the Bourne Magnetic Truck
The radius rod is solid. Note the rocking block spring hanger



Front View of the Bourne

Note the bulge in front cross member which stiffens same and acts as a bumper

ACME WAGON COMPANY ARE REBUILDING PLANT

The Acme Wagon Co., Emigsville, York County, Pa., maker of the Acme truck, was visited by a very disastrous fire which destroyed the greater part of the company's plant. A new and larger plant is however under course of construction which will soon enable this concern to be in full and complete operation again.

SPECIAL BOXES CARRY RUGS

A truck specially designed for use in carrying carpets and rugs, as well as parcel merchandise, is operated by the Wurzburg Dry Goods Co. at Grand Rapids, Mich. At

each side, along the base of the body, run two boxes, 20 in. square, the full length. Each is equipped with a cover that may be locked and in these compartments all rugs and carpets are carried easily. The idea gets clear away from the usual plan of carrying rugs and carpets on the roof of the body, which practice not only weakens the body but exposes the materials to the weather. The strong boxes also prevent breaks and other damage.

This truck is also equipped with heavy wire cage sides which admit of loading to the limit of capacity with small parcels and packages. Storm curtains on the sides and rear prevent any possible damage in inclement weather.

Why is the CCJ the only truck paper a member of the Audit Bureau of Circulations? Here's food for thought

The Manly Truck Has Distinctive Points

Offered in 3000 and 5000 Pound Capacities. Rear Springs Are Free of All Drive and Torque Strains. Both Models Offered With or Without Electrical Equipment.

A NUMBER of distinctive points of design are found in the trucks being produced by the Manly Motor Corporation of Chicago for the coming year. These departures from usual practice are due to the combination in one chassis of many features of both American and foreign commercial car development. The constructions adopted are those found to give constant service under severe conditions while lessening the operating costs and time required for upkeep and increasing the ease of handling and the road speed of the trucks. Two models are being made at present, one of 3000 lbs. capacity and the other of 5000 lbs. Both follow the same general design with such changes in weight and size as called for by the difference in loads carried.

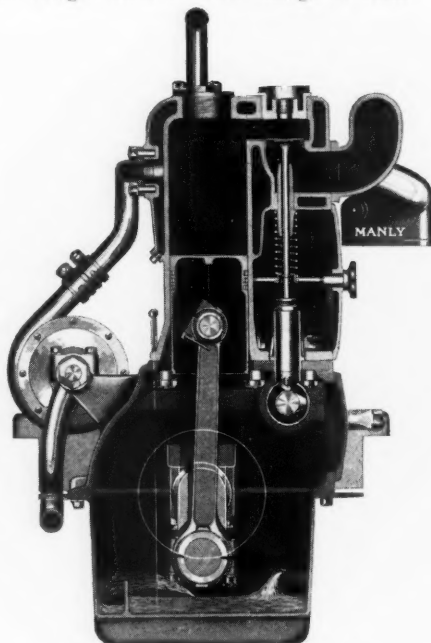
It is in the load carrying and power transmission parts of the trucks that some of the most interesting features are found and those for which the strongest claims are made. One of the most noticeable points is that the driving connection between the rear axle and the frame is made through four pivoted and swivel rods, two being on each side of the car and arranged one above the other. These rods not only serve to drive the car, but also take the torsional or twisting strains from the rear axle. The springs are thus freed from all loads other than those of carrying the weight of the frame and body and can therefore be shackled front and rear.

In addition to these advantages, which might have been obtained with the conventional combination of radius rods and torque arm, the Manly suspension secures other results equally important. A difference of spacing between the front and rear ends of the rods allows the rear axle to move with the front universal as a center when the springs are compressed and allowed to expand. This avoids angular movement of the rear universal, limits the maximum bending of the front one to a little more than two degrees and entirely

avoids the fore and aft movement of the joints which would require the use of slip joints.

Brakes

Both brakes are of the internal expanding type operated through equalizers to secure an even effect on both wheels. The equalizer shaft is carried in line with the forward centers of the lower driving rods so that its distance from the rear axle and its distance from the brake pedal and lever never changes. The brake arms on the shaft are as long as the distance between the upper and lower rods so that the form of brake structure corresponds to that of the driving rods and there is no tendency for the brakes to either tighten or loosen on rough roads or with change of load.



Cross-Sectional View of the Manly Engine

All parts of this engine are claimed to have thorough lubrication. This illustration clearly shows the general construction of the engine.

Engine

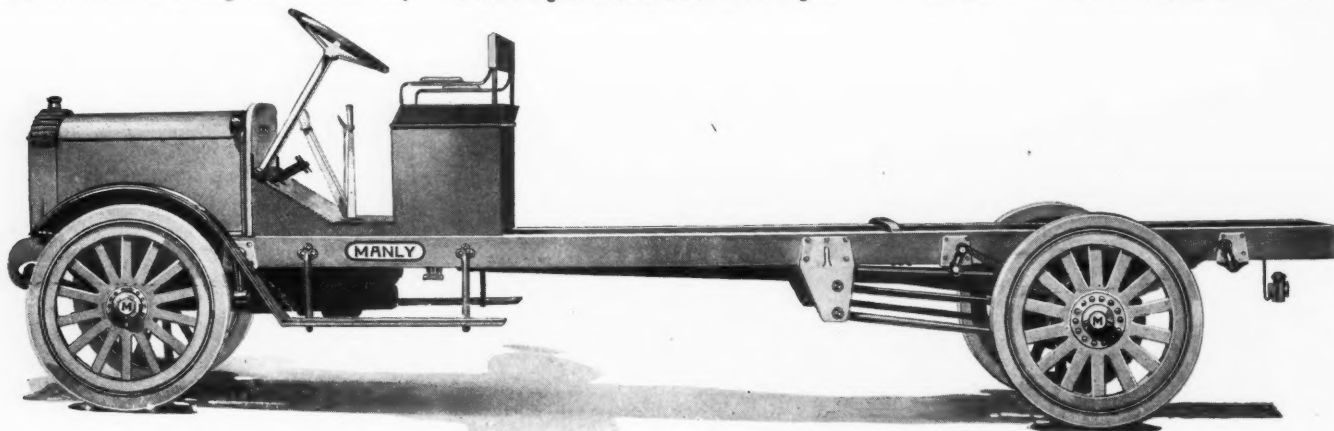
The engine is of the four-cylinder type with the clutch and transmission carried as a unit, the whole power plant being supported at three points and having no connection between the control pedals and the frame. The engine of the 3000 lb. model develops 34 brake h.p. and 138 ft. lbs. torque, while the unit in the larger model develops 40 brake h.p. and 160 ft. lbs. torque. The crankshafts are of chrome nickel steel and their bearings, as well as those of the connecting-rods, are of Falrig metal with reinforced backs. Two large hand-holes are provided in the upper half of the crankcase through which the bearings may be inspected without removing the lower half of the case. The exhaust and inlet manifolds are cast in one piece with the inlet almost entirely enclosed by the exhaust so that the fresh gases are heated to a point that allows satisfactory use of very low grade fuels.

Control

The spark and throttle levers have been replaced on the steering wheel by a single control by means of which the speed of the truck may be set, and is then automatically maintained at any desired point. Fuel is fed in proportion to load carried and road conditions encountered without the necessity of attention from the driver other than the original setting for rate of travel. A governor is incorporated with this control which limits the speed of the 3000 lb. car to 16 m.p.h. and that of the 5000 lb. truck to 14 miles.

The Oiling System

Oil for the engine is carried in a reservoir on the crankcase and from this point is forced under pressure by means of a gear pump to a passage in the crankcase. From this passage the oil flows to troughs below each connecting-rod and enters the connecting-rod bearings at each stroke of the pistons. The oil vapor, with which the



Side View of the Manly Two and a Half Ton Truck

This has four-cylinder engine, 4 x 5 3/4 in.; speed of truck, 14 m. p. h.; wheelbase, 168 or 180 in.; 36 x 4 in. tires on front and 40 x 7 in. single on the rear. With electrical equipment, the price is \$2375; without this equipment, the price is \$2250

Advertising appropriations bring greatest returns when expended in the CCJ

interior of the crankcase is filled, is collected by small troughs and led to the center of each crankshaft bearing. Oil thrown from the connecting-rods lubricates the cylinder walls and part of it is collected by wide grooves to be led through hollow wrist pins to the upper bearings of the rods. Part of the oil spray drains into pockets and flows down through the camshaft bearings. A plunger with a visible bob on the crankcase tells the operator how much lubricant remains in the reservoir. Oil vapor is introduced into the valve stem compartment through openings leading from the crankcase so that all parts are constantly lubricated.

Transmission

In the transmission used on Manly trucks the gears are always in mesh and all speed changes are secured through the engagement of heavy jaw clutches similar to those used for engaging high speed in most forms of sliding gear sets. There is a set of these jaws on the face of each gear and corresponding sets on the shafts. It is by locking these sets of jaws together that the speeds are obtained rather than by meshing and unmeshing the teeth of the gears themselves. Engagement of any speed

has been increased to 46 to 1 in the small truck and to 52 to 1 in the large one, thereby providing fifty per cent. more leverage for use in emergencies than has heretofore been used.

Clutch

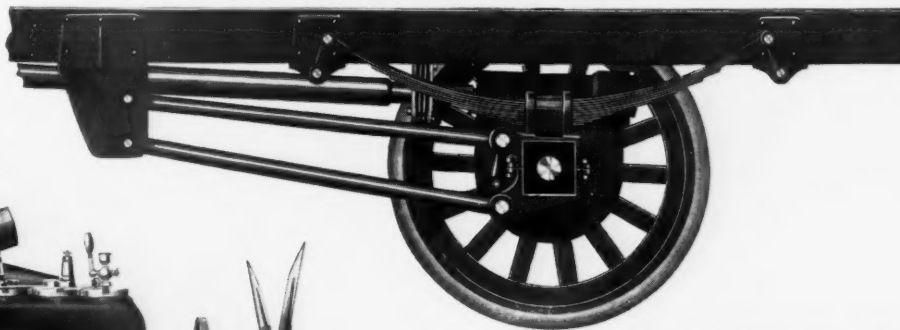
The clutch is of the multiple dry disc type, composed of Raybestos rings between driving and driven discs of saw blade steel. A total surface area of 840 sq. in. is secured so that positive action is obtained with a spring pressure low enough to allow easy operation. An offset mounting of the release center automatically provides easy engagement even though the driver's foot be quickly removed from the clutch pedal.

Universal Joints

The universals are composed of driving and driven flanges each carrying three arms. Between the arms are bolted rings

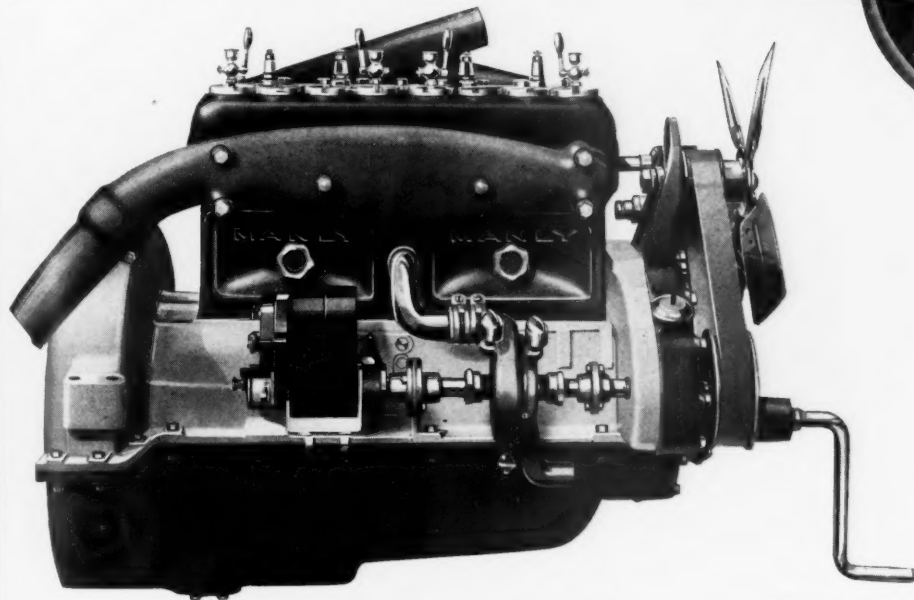
Spring

The front spring suspension forms an important factor in easy steering of Manly trucks and allows travel over the roughest roads without jerkiness of the hand wheel, excessive strains on the steering gear or sidewise movement of the front road wheels. This effect is secured by pivoting the rear end, rather than the front end, of the front springs to the frame and by shackling their forward ends. This changes the pivoted end of the spring, from which the axle is supported and around which it moves, from a point some distance ahead of the axle to a point just as far back of the axle. The steering connections on the front axle are of course connected with the steering gear proper through a fore and aft rod which is pivoted to the steering gear arm at a point which, with the new



Manly Method of Taking Drive and Torsional Strains

This is accomplished by two pairs of rods, one on each side of the car, each being pivoted at both ends. Driving forces are taken through both pairs of rods, torque reaction compressing one and pulling on the other.



Right Side of the Manly Engine

Cylinders are cast in pairs; crankshafts are of nickel steel, seventy tons tensile strength per square inch; main and connecting-rod bearings are of Fahrig metal with steel-backed liners. Push rods have rollers running on cams. The illustration shows magneto and water-pump mounting.

may be easily made and without danger of breakage regardless of the relative speeds of engine and truck.

An unusual combination of speed ratios has been adopted and it is by this means that the advantages of a four speed transmission are secured together with the simplicity of three speed construction. These points have been incorporated in the Manly transmission by providing a first speed of much greater reduction than usual, reaching 35 to 1 in the 3000 lb. car and 39 to 1 in the 5000 lb. model. The second speed ratio is twenty-five per cent. higher than in former types, thus allowing a moderate engine speed for hard and continuous pulling at a fair rate of travel. The total reduction from engine to wheels in reverse

of flexible material which is said to be unaffected by weather conditions or bending and through which the driving power is transmitted. The propeller tube is rotated at constant velocity due to the gradual deflection of these rings as distinguished from the more noticeable variations in speed induced by the pin or block universal. This form of coupling requires neither lubrication or adjustment. The driving shaft is made from a hollow tube 3 in. in outside diameter. The stiffness of this large diameter together with the absence of speed variations due to the flexible couplings and the prevention of universal motion by the drive rod construction allows the use of but two joints and prevents vibration or whip.

construction, is practically in line with the rear or pivoted end of the spring. Inasmuch as the two pivot points are thus brought so near together the front axle itself and the steering connections on the axle move in practically the same curve so that there is little tendency to relative movement between the steering parts as compared with the older method of using a spring pivoted in front while the steering parts attach to a rod pivoted in the rear.

Rear Axle

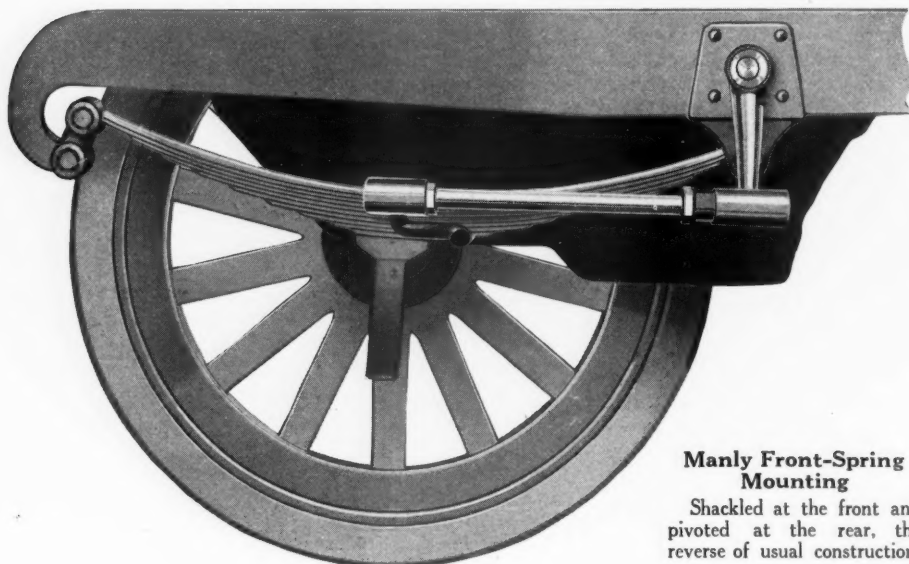
The rear axle is of the worm drive type with the worm, worm wheel and differential mounted on annular ball bearings. Thrust is taken by a large ball bearing which holds the worm against endwise movement at one end only, leaving the other end with its radial bearing free to expand and contract without wedging or bending. The axle housing is a one-piece steel casting from wheel to wheel and the worm and worm wheel are mounted as a unit on a steel carrier fitting into the center of the axle. The axle shafts are of nickel steel, heat treated and so proportioned that the stress is uniform from end to end. The shaft of the 3000 lb. car is 2 3/8 in. in diameter and the axle is guaranteed for a load of two and three-quarter tons on the rear tires. The shaft in the 5000 lb. car is 2 3/4 in. in diameter and its axle is guaranteed for four tons on the rear tires.

The cooling water is circulated by a centrifugal pump through a radiator of fin and tube construction which is carried in a cast iron housing mounted in trunnions on the frame. The rear of the radiator and the fan are enclosed by a sheet metal hood so that the suction is evenly distributed over the entire cooling area. Fuel is supplied to the carburetor from a vacuum

and the brake mechanism so that wear may be compensated for with little expense for renewal.

Frame

The frames are 6 in. deep on both models and taper from a width of $3\frac{1}{2}$ in. near the center to 2 in. at the ends. The front part of the frame is narrowed so that short



Manly Front-Spring Mounting

Shackled at the front and pivoted at the rear, the reverse of usual construction.

tank under the hood so that the carburetor may be mounted close to the cylinder casting and condensation avoided during cold weather. A governor is fitted which limits the speed of the 3000 lb. car to 16 m.p.h. and that of the 5000 lb. truck to 14 miles.

Electrical System

The electrical system is of Bosch-Rushmore make throughout. It consists of a self contained high tension magneto which is controlled from a rod on the dash without the use of a grounding switch or any low tension wires, the entire system of ignition wiring consisting of the four leads to the spark plugs. Starting and lighting equipment is of the twelve volt single wire type with all switches and open points centralized and located on the negative side of the circuit from the battery. The starting motor is carried on the flywheel housing and meshing of the pinion is secured by the magnetic effect of the fields on the armature when the starting switch is closed and without any form of outside mechanical connection. The dynamo consists only of the armature, fields, brushes and commutator and is connected with the balance of the system by two wires. No cutout is used and the regulation is secured through the design of the machine without any additional parts. The design also provides for a proportionate increase in current output when the lamps are burning.

Annular ball bearings are installed throughout the trucks, the double row type being installed wherever thrust loads are encountered. These bearings are used in all four wheels, on the rear axle shafts, the differential, the worm, and all transmission shafts. Bronze bushings and thrust washers are provided for the driving rod joints

turning may be secured. All wheels have fourteen spokes of square section. The spokes on the smaller model are 2 in. thick front and rear, while on the larger car they are 2 in. in front and $2\frac{1}{2}$ in. in the rear. 40 in. wheels are used on the rear of the 5000 lb. model and all other wheels are 36 in. in diameter.

The wheelbase of the $1\frac{1}{2}$ ton truck may be either 13 or 14 ft. and that of the $2\frac{1}{2}$ ton model may be 14 or 15 ft. By placing the rear axle well back the weight is so distributed that the effects of excessive overhang are avoided.

Accessibility has been secured by bringing all points for lubrication to the outside of the frame and by the entire absence of parts requiring either lubrication or adjustment from under the body space of the trucks. Interchangeability and proper proportioning of all parts have been insured by following the standards recommended by the Society of Automobile Engineers for sizes, materials, heat treatments and other details of all the parts entering into the construction of the trucks. Uniformly good workmanship is in large measure due to the system of assembly in which the chassis passes from group to group of workmen, each group performing one part of the assembly and performing this same part on each truck.

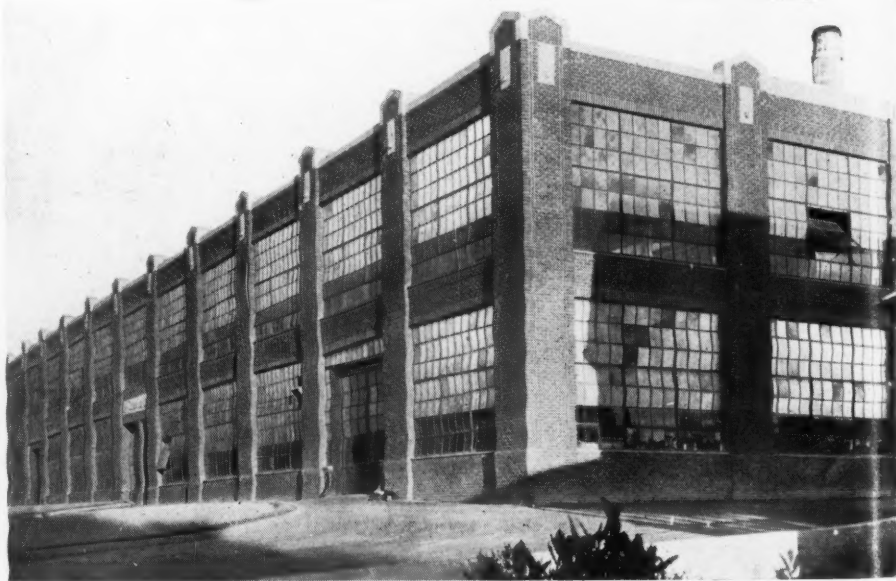
The price of the trucks with driver's seat, horn, tools, running boards, front fenders and electric starting and lighting is \$1925 for the 3000 lb. car and \$2375 for the 5000 lb. model. Without electric starting and lighting the prices are \$1800 and \$2250 respectively.

NEW BUILDING FOR AUTOCAR COMPANY COMPLETED

The new two-story factory building of the Autocar Co., at Ardmore, Pa., which has been in course of construction for some time, has just been completed. It is a modern fireproof building comprising 85,000 sq. ft. of floor space and is located on Greenfield avenue near the main plant of the company.

It will be used for final work on chasses and bodies. The chasses will go to this new plant directly from the road test and all the painting, finishing and shipping departments will be housed here.

The Autocar Co. reports a very marked increase in business over any previous period in their history. All of their product is being sold to domestic business concerns for use in delivery work.



New Addition of the Autocar Company, Which Will be Used for Final Work on Chassis and Bodies

The New Two and a Half Ton Union Truck Makes Its Debut

AT Bay City, Mich., is now being manufactured the first series of Union trucks of 2½ tons capacity equipped either with Russel internal gear drive axles or Sheldon worm drive, as desired. The trucks are built with pressed steel seat and dash construction and fitted with slat and canvas curtained cab top mounted on tubular steel supports as regular equipment, this part being sold with the truck chassis at \$1875. Of course, special bodies to suit different requirements may be had. The illustration shows it with a stake body.

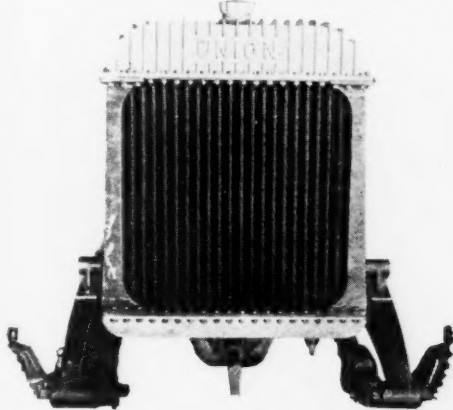
Specifications in Brief

These trucks have a capacity of 2½ tons, a wheelbase of 152 in., are powered by a

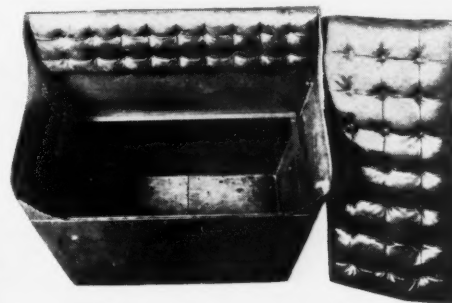
4 x 6 in. Wisconsin engine, having a 4-bearing crankshaft with a Fuller three-speed sliding gear transmission in unit with the engine, with center control levers. Ignition is by Eisemann magneto mounted on an integral bracket on the right of the engine, shaft driven through flexible coupling from the half-time gears. The clutch is of multiple disc type, metal to metal, operating in oil and can readily be adjusted by cap screw and lock nut from underneath.

A Schebler carburetor cares for the gasoline mixture with gravity feed from the dash tank. Drive is by shaft using Universal Product Co.'s joints to the rear axle which, as before mentioned, is either worm or internal gear, as desired. The driving shaft is a swaged tubular construction and is so arranged that as far as the fore and aft movement is concerned, it floats between flat spiral springs, thus relieving the bearings of all strain. 56 in. rear springs of semi-elliptic type, 3 in. wide are used, while the front springs are 41 in. center to center, 2½ in. wide. Both are mounted on top of the axle and held by four massive U bolts. The frame is A. O. Smith Co.'s

pressed channel section 6 in. depth, 2¼ in. flanges and made from ¼ in. stock. Its total length is about 225 in., width 32 in., with straight sides. This gives 12 ft. of floor space back of the driver's seat and the frame runs clear to the end of the body, giving it ample support. It is unusually heavy for a truck of this capacity. The wheels are square spoked with 39 x 4 in. solid tires on the front and 39 x 6 in. solid at the rear. The front spokes are 2 in., rear 2½ in. The tread is 56 in. both front and rear, so that the wheels track for country use. The gear reduction is 7.4:1. Bock roller bearings are used in the front wheels and Bower in the rear wheels. The front axle is Sheldon I section construction.



This trunnion mounting of the radiator provides flexibility. The radiator is composed of aluminum tanks top and bottom with cast-steel columns at the sides and vertical copper tubes between.

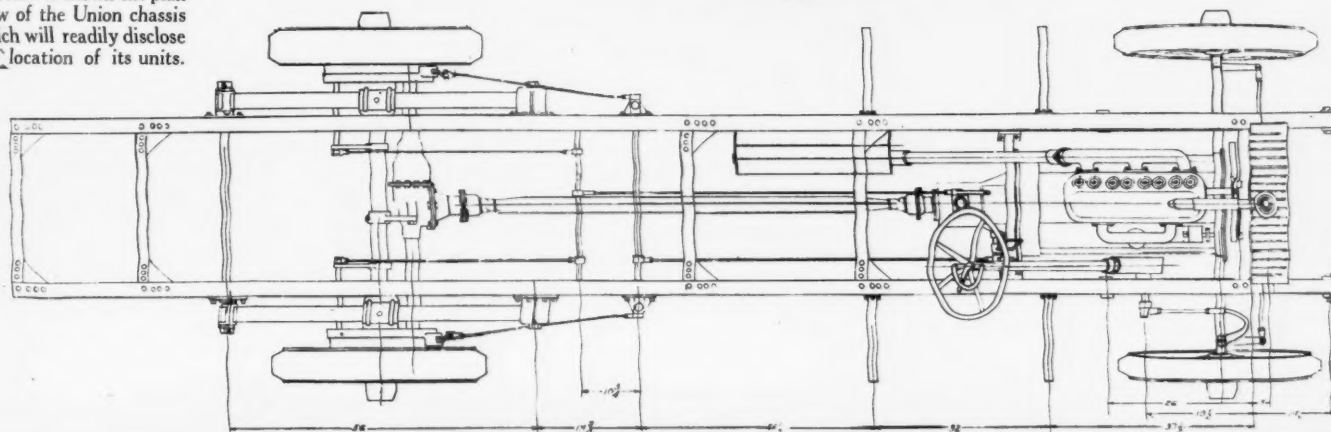


Seat is of pressed steel and has large compartment beneath for tools. This part is light and strong.



On the left is shown the Union truck with stake body. The price for this chassis, with cab top, is \$1875. The capacity of this truck is two and a half tons. The wheelbase is 152 in. The 4 x 6 in. Wisconsin engine, Fuller transmission, and disc clutch, comprise the power plant.

Below is shown the plan view of the Union chassis which will readily disclose the location of its units.



Everybody who is anybody in the truck industry reads the CCJ

Special Features

The foregoing gives briefly the general layout of the truck. It has several features which are peculiar to itself. Among these may be mentioned the liberal use of pressed steel parts. The seat, which is of this

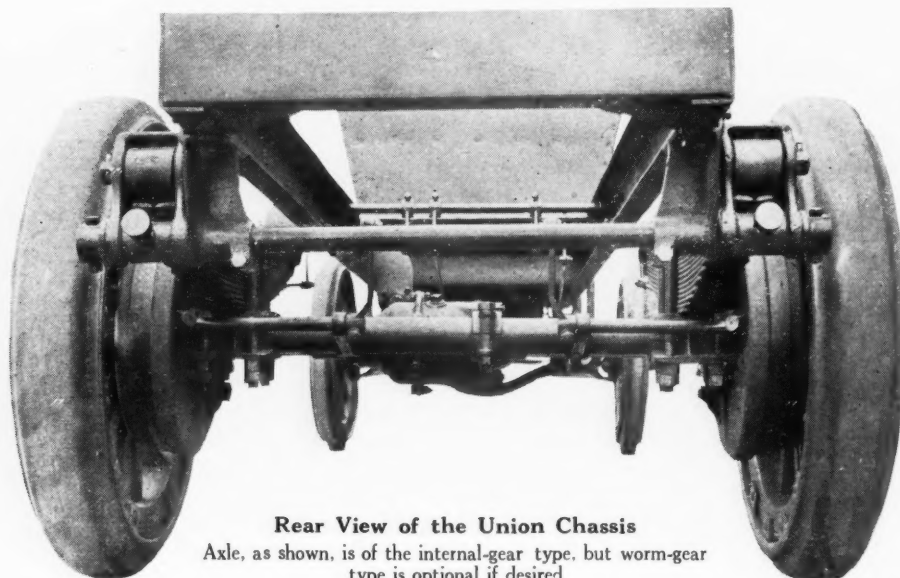
covered and is made without mortised joints. It is supported by four tubular rods held in cast steel brackets on the seat and dash, the dash brackets also forming integral supports for the lamps. The cab can be completely enclosed by curtains.

The emergency brakes are on the inside, 17 in. diameter by 2 in. face. Service brakes, pedal operated, are on the outside, 18 in. by 3 in. face. As mentioned, a special shield is provided, protecting the emergency from mud and dirt. Control is by steel pull rods from the cross brake shaft $1\frac{1}{4}$ in. in diameter, the connections being so designed that the up and down motion of the body when running light does not alter or interfere with the brake adjustment.

Steering is by a Ross gear, so arranged that when the wheels are cramped to the maximum, they do not rub the drag link. The cross tie rod is higher than the lower point of the front axle and in front of it.

Oil cups are liberally used throughout on such places as the spring bolts. These bolts are also a special construction peculiar to the Union truck. The front spring bolts are $\frac{7}{8}$ in., while the rear are $1\frac{1}{8}$ in. in diameter. The oil cups are placed on top. The end of the bolt, which is drilled hollow, is threaded and plugged by a screw which is removable for cleaning, showing the care which has been given to oiling details.

A production of a truck a day for the coming year has been planned and equipment is now being placed in the factory at Bay City for this purpose. The firm is well financed and backed by some of the wealthiest men of the state, so there is every reason to believe that the Union Motor Truck Co. will very rapidly become a factor in the industry.



Rear View of the Union Chassis

Axle, as shown, is of the internal-gear type, but worm-gear type is optional if desired

construction, is shown in detail in an accompanying illustration and provides an unusually large space under it for tools, etc. The assembly is light and strong. The dash, also of pressed steel, has strapped to it a 17-gal. welded steel tank of peculiar shape as shown. Feed is through a strainer by gravity to the carburetor.

The Russel axle is a specially designed internal gear construction. It has grease retainers to prevent the oil from the differential working into the internal gears.

Engine Mounting

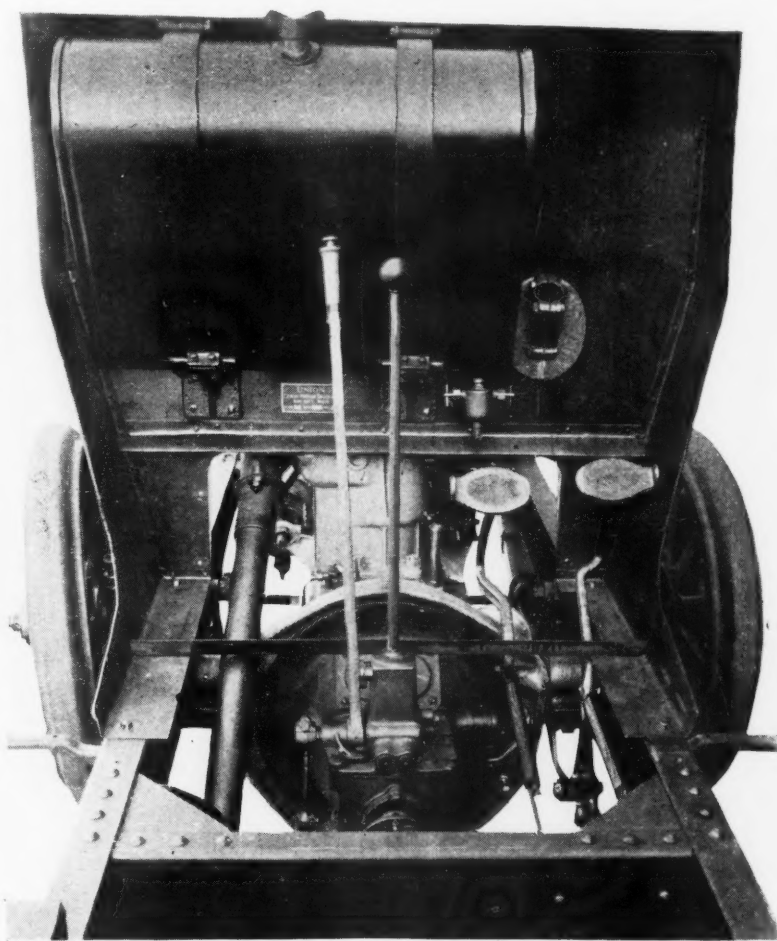
The method of mounting the engine, which is a unit power plant, is of Union design and consists of a cast steel ring construction with trunnion arms at either side. This ring is bolted to the bell housing of the engine and the transmission is in turn bolted to it. Its trunnion arms rest in cast steel mounts which are bolted to angle strips riveted securely to the frame side members. As the front of the engine is carried by a support at the center, the mounting is virtually three-point and flexible. This front hanger consists of another steel casting with two lips which rest on top of the front cross frame member.

The radiator is of special design and built at the factory, having an aluminum tank at the top and bottom, the upper one being ribbed. These tanks are connected by cast steel columns at the sides. Plain vertical copper tubes closely spaced are used, thus making a very simple radiator to repair.

No malleable iron castings are used, but cast steel throughout for brackets, etc. Jigs are used in the construction for drilling all location holes in the frame and parts.

The hood construction is also unusual, the sides being hinged at the bottom and latched at the top, so, instead of opening upward, they open downward against the mud guards. The top section of the hood remains stationary, but of course can be removed if necessary.

The cab construction consists of three automobile top bows and on the outside a wagon bow stripped with slats and canvas



View of the Union Dash, Tank and Rear of Power Plant

The dash is of pressed steel and has strapped to it the seventeen-gallon, welded-steel gasoline tank shown. Feed from the tank to the carburetor is by gravity, the pipe being but one foot long

Plenty of the right kind of circulation means quantity results to advertisers in the CCJ

Firestone

TRUCK TIRES

There Is a Firestone for More Economy —More Miles in Your Truck Service

THOUGH there is a special Firestone tire to meet each particular need they have two qualities in common—extreme toughness, giving longest wear, and resiliency that insures protection to the truck mechanism. This is a Firestone success, so far unmatched. Proof is found in the preference given to Firestone tires by truck owners of the largest experience. Almost twice as many Firestone truck tires are in use as of any other one make.

Two of the many types of Firestone Tires are here shown—the Pressed-on type for heavy duty (on the left) and the Clincher Flange for I H C trucks (on the right).

The Firestone Truck Tire service is of very great advantage to every truck owner or prospective purchaser. In every large trucking center there is a Firestone Service Station with experts who will be glad to advise with you. This implies no obligation whatever. Call the station near you. Or write us for details and low prices.

Firestone Tire & Rubber Co.

"America's Largest Exclusive Tire and Rim Makers"

Akron, Ohio—Branches and Dealers Everywhere

Wilson Chainless-Drive Trucks

WHILE actually having been engaged in the manufacture of motor trucks since 1913, the J. C. Wilson Co., of Detroit, Mich., has gone about the business in a very quiet way and not until the first of February, this year, did it actually enter upon what can be classed as a production basis. The present machine, while rated to carry 2 tons load upon chassis, is primarily designed to undertake trailer work, and the company is a great advocate of the semi-trailer type of body with guarantee on such up to 4-tons capacity.

Engine

The engine is of the four-cycle, water cooled type, with cylinders cast in block, bore being $4\frac{1}{8}$ in. and stroke $5\frac{1}{4}$ in., developing 30 h.p. at the maximum governed speed of 1050 r.p.m. Both intake and exhaust valves are interchangeable, 2 in. in diameter and are enclosed by large removable plates on the left side. Lubrication is effected through positive plunger pump system with constant level of oil and direct leads to front and rear bearings. The exhaust is on the left side and on the right is mounted the pump and magneto

driven from one shaft. Ignition is obtained from high tension, waterproof, Eisemann magneto having a fixed spark and attached to the engine crankcase by quick detachable clamp.

Clutch

The clutch is a pressed steel, leather-faced cone with a diameter of $15\frac{3}{4}$ in. and a $2\frac{5}{8}$ in. face, transmitting its power to the transmission gear set through a short driving shaft fitted with double universal joints.

Transmission

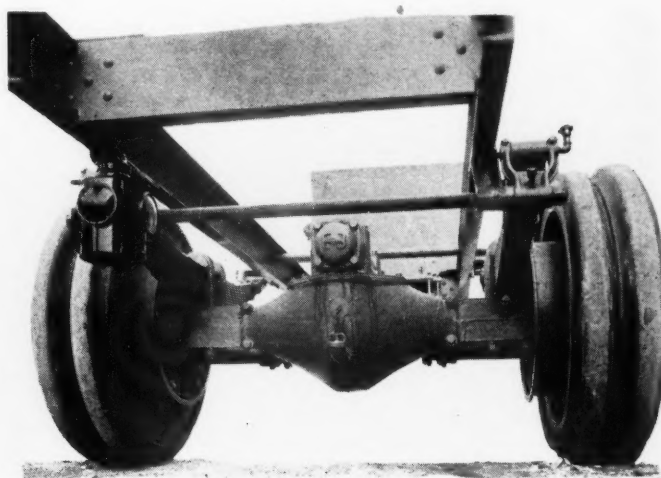
The transmission is of special design and mounting, constituting a separate unit from



Front View of Wilson Truck

Showing bumper, dropped front axle and large radiator filler. The radiator is not spring-suspended but is cushioned on wooden cross pieces

The present model is very much stronger and more powerful than that of last year, which established the world's record for motor trucks in transporting its full load up Pike's Peak. Model E represents the design of Chief Consulting Engineer Vincent Link. The frame is of 6 in., 8 lb. rolled channel steel, heat treated with a forward curved tubular guard, held in position by specially designed front spring brackets and affording ample protection to both wheels and radiator. The latter is of the built-up type with cast iron tanks of large size and a removable finned tubular core having a total water capacity of $6\frac{3}{4}$ gal., and presenting a frontal cooling area of 557 sq. in. Unlike all former models, the radiator spring suspension has been removed and in the new machine the radiator is cushioned by means of a wooden cross member covered with layers of felt and leather between it and the forward cross member of the frame on which it is mounted.



Rear of Wilson Truck

The rear axle is a worm-drive member and is of three-quarter floating type with a one-piece forged housing of exceptional strength



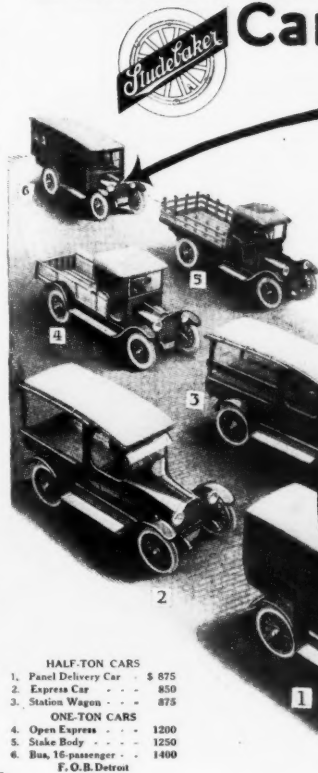
Wilson Two-Ton Chassis, \$2350

This machine, while rated to carry two tons load on the chassis, is primarily designed to undertake trailer work, and the company is a great advocate of the semi-trailer type of body, with guarantee on such up to four tons capacity.

Make your product pay—advertise in the CCJ

STUDEBAKER

Commercial Cars



This new 16-passenger Studebaker Bus at \$1400 is another example of the opportunity that a dealer has when selling Studebaker Commercial Cars. It is only one of the SIX Studebaker Commercial Cars.

No more convincing proof can be offered of the possibilities of quantity production than the unusual value this bus represents. Hundreds of Studebaker Buses have been in operation for years.

seats, curved back, electric lights; electric push buttons and sliding windows; entrance to right front door only. Door is controlled by driver through operation by a lever---door has no handles---thus, passengers can not open it to enter or leave car while in motion. Lots of leg-room. Highest grade pay-as-you-enter coin box. Equipped with Pierce Speed Governor.

Nothing like it at any price like the price.

Write at once for complete information.

STUDEBAKER
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- HALF-TON CARS
1. Panel Delivery Car - \$ 875
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 6. Bus, 16-passenger - 1400
- F. O. B. Detroit

A Company known the world over for the high quality of its products, equips its commercial cars with Pierce Governors.

Why?

Because they know that highest efficiency can not be attained unless the vehicle speed is automatically controlled and—



PIERCE GOVERNORS

are the only Governors that come up to their standard of quality and performance.

PIERCE GOVERNOR COMPANY

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the engine, and is supported in the frame by a three-point suspension permitting of unusually quick removal. Both transmission shafts and gears are of special nickel steel carbonized and heat treated. Hyatt roller bearings of large size are used through transmission, which is of selective sliding gear type, having three speeds forward and one reverse, the gear ratios being 31.3:1 on low, 14.6:1 on second and 8.6:1 on high, which is direct. Reverse is 41:1.

Axles

Propeller shaft is $1\frac{3}{8}$ in. in diameter, fitted with double universal joints, and when the truck is loaded, presents a straight line drive to the rear axle. This member is of the worm and worm-wheel three-fourths floating type, with one-piece forged steel housing of exceptional strength and allowing of $10\frac{1}{2}$ in. road clearance.

Ball bearings are used throughout the rear axle and both the service and emergency brakes are of the expanding type on drums attached to the rear wheels. These are 18 in. in diameter and the brake shoes $2\frac{1}{4}$ in. in width, lined with "Thermoid."

The front axle is of I-beam section, $1\frac{3}{4}$ x $2\frac{3}{4}$ in., with Elliott type of steering knuckles. The spindle is 1 31-32 in. in diameter, fitted with double roller bearings of large size. The ground clearance under the lowest point of front axle is 10 in. Both front and rear wheels are fitted with 36 x 4 in. interchangeable solid rubber tires, those on the rear wheels being of the dual type. In this new model special attention has been given to spring suspension to secure easy riding qualities combined with great strength. Both front and rear are semi-elliptic, the front measuring 40 in. length by $2\frac{1}{2}$ in. in width and having ten leaves, and the rear, 52 in. in length by 3 in. in width with twelve leaves. These have been designed to take both the thrust and torque of the rear axle, dispensing with the necessity of radius and torque rods.

Throughout the truck all points subject to wear, like spring ends, brake link ends, etc., are all amply provided with bronze bushings.

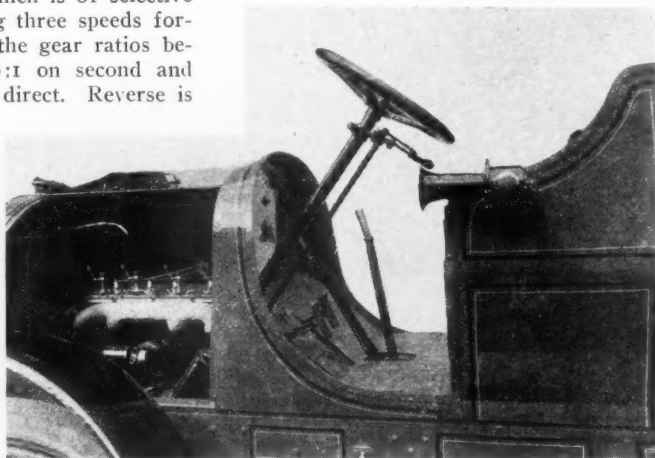
Steering Gear and Control

The steering gear is of large size and of the cross type, mounted on the left side and of considerable angle to afford maximum comfort in driving, and the hand-wheel is of 18 in. diameter with pressed steel web. Below this is mounted conveniently a throttle lever in addition to foot accelerator pedal.

Gear shift and emergency brake levers are mounted in the center of the truck so as to afford easy access from either side of vehicle. A 20 gal. cylindrical steel tank

with welded seams is fitted below the driver's seat which, like the dash, is of pressed steel.

Both seat and back cushions have been constructed with the idea of furnishing the greatest comfort to the driver.



Wilson Truck—Driver's Compartment

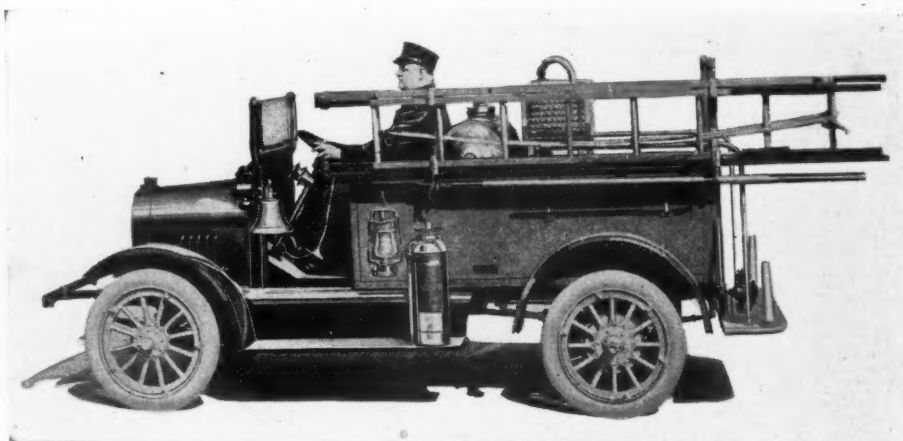
Showing hooded dash, left-side drive, center control and engine, with hood raised

Forward front fenders are of heavy gage pressed steel with unusually strong and substantial supporting irons, and are cut short at the front to permit of any necessary work on the engine.

Quite a departure from standard truck practice is in the mounting of the forward lamps which are of special locomotive design, made of heavy pressed steel. These have been taken from the usual position on the dash and are rigidly attached to the forward end of the frame side members so that the maximum amount of light is directed to the road and vibration and chance of breakage is greatly reduced.

The tread is 58 in. and the wheelbase 144 in. Overall length of the standard chassis is 18 ft., and the length of frame back of driver's seat, 10 ft. 6 in., with a width of 33 in.

Incorporated in the rear wheel hub cap is a novel and simple form of wheel pulley, previously described in this publication. The price of standard chassis is \$2350.



New Fire Truck Added to the Vim Line

This fire truck, offered by the Vim Company, sells for \$1385 complete, with all equipment

For its readers—information; for its advertisers—results. That's the purpose of the CCJ

FIRE TRUCK ADDED TO VIM LINE

The insistent demand from fire department officials for fire trucks has caused the Vim Motor Truck Co. to add a special fire truck model to their already very complete line. The truck is mounted on the standard Vim chassis.

This Vim truck has a three-fold usefulness, first as a complete apparatus for small fire companies; second, as an auxiliary chemical wagon for a large department, and third, for the use of the fire chief. The equipment used on the apparatus was designed by one of the country's leading experts and is in accordance with standard fire department practice. Every part is stated to be fully guaranteed against defects in material and workmanship. The body is of sheet steel, with polished brass hand rails and heavy rear step suspended from the steel frame. The seat has a leather cushion and is large enough for two men. Directly back of the seat the chemical tank is mounted. Back of the tank is a fire hose compartment with a capacity of 600 ft. of $2\frac{1}{2}$ in. hose. The chemical tank, which is of 35 gal. capacity, is of the well-known Champion type.

That part of fire equipment which is perhaps the most important, because upon it depends the safety of so many men, is the ladder. The Vim truck has been equipped with a ladder built scientifically of the finest wood, to stand the most severe strain. This ladder is 16 ft. long and is of the solid side rapid hoist extension type. An 8 ft. pike pole is carried on the ladder brackets. Other equipment includes two polished brass standard lanterns, one 6 lb. pick head fire axe, one standard crowbar, one 3 gal. polished copper extinguisher, two hardwood play pipe holders, one 10 in. polished brass locomotive bell. This truck is priced at \$1385 complete, with all equipment.

The Vim Co. is also prepared to build fire apparatus to meet individual requirements. Any such apparatus would be mounted on the standard Vim chassis, which has been brought to the highest pitch of development and is the only type built by the company. The reasonable price and the quality offered in all Vim models is attributed chiefly to the large production and concentration upon a single chassis.



Links the merchant to his customer

In the modern business establishment the sale is not complete until the goods are delivered to the buyer's house *on time*. To do this without incurring exorbitant expense is a problem that puts gray hairs in many a business man's head and he is eager to find a real solution of this problem.

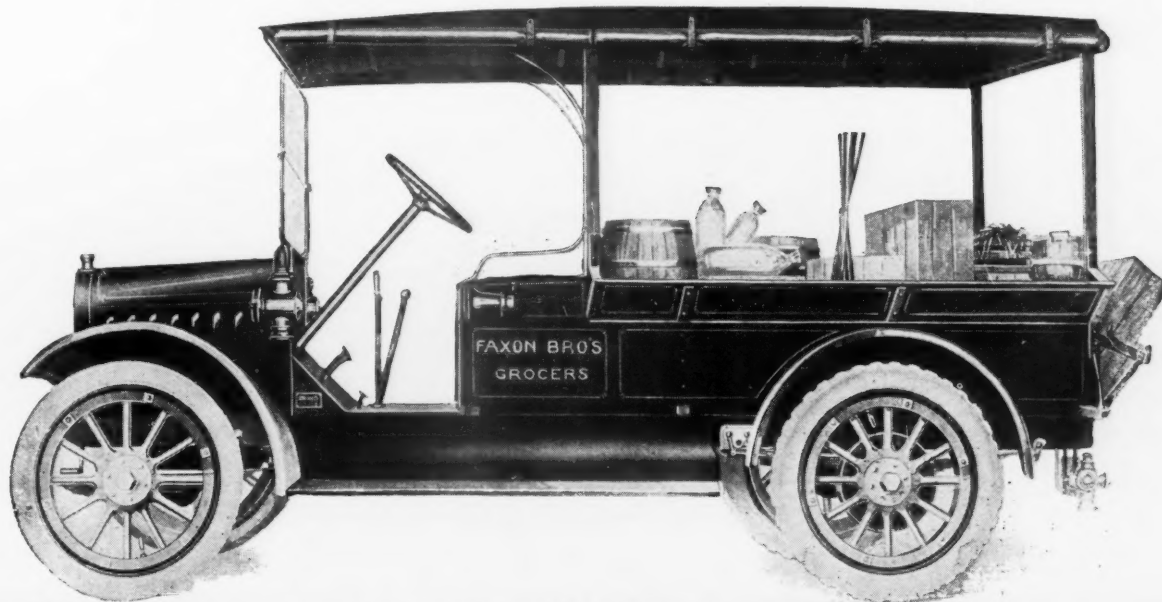
Here is your opportunity—no matter in what section of the country you may be. Show these men the Stewart, explain its advantages, prove its inexpensiveness, and show how it is just the truck to link up the merchant with his customer and you will do a wonderful business.

This is not theoretical but actual facts. Dealers all over the country are doing a splendid, profitable business with the Stewart. They are selling it widespread, because it has the right capacity, is inexpensive to operate, makes a good impression and makes quick deliveries possible at very moderate cost.

What others are doing you can also do. There's lots of money to be made in your territory if you get busy at once. Write for the agency, before your territory is definitely closed. We have something interesting to lay before you.

Stewart Motor Corporation

Superior and Randall Sts.
Buffalo, New York



When Writing, Please Say—"Saw Your Ad. in the CCJ"

THE ELLSWORTH ONE THOUSAND POUND TRUCK, \$695 COMPLETE

THE Mills-Ellsworth Co., Keokuk, Ia., is manufacturing a 1000-lb. commercial car known under the trade name of Ellsworth. This car has a carrying capacity of 1000 lbs., and is called the model 25-A. The price complete with express body and electric starting and lighting outfit is \$695.

Engine

The engine is of Lycoming make, being located under the hood. It has four vertical cylinders with bore of $3\frac{1}{4}$ in. and stroke of 5 in. Cylinders are cast in block with all valves on the right side. Cooling is by water, making use of the thermo-siphon system. A fan is placed in front of the engine and this and the square tube Candler radiator comprise the cooling system.

Ignition is a single system, using an Apple magneto with hand spark control. The gasoline tank is located under the seat, fuel being supplied to the Carter carburetor by gravity.

Clutch and Transmission

The clutch and transmission are of Grant-Lees make, the former being of the cone

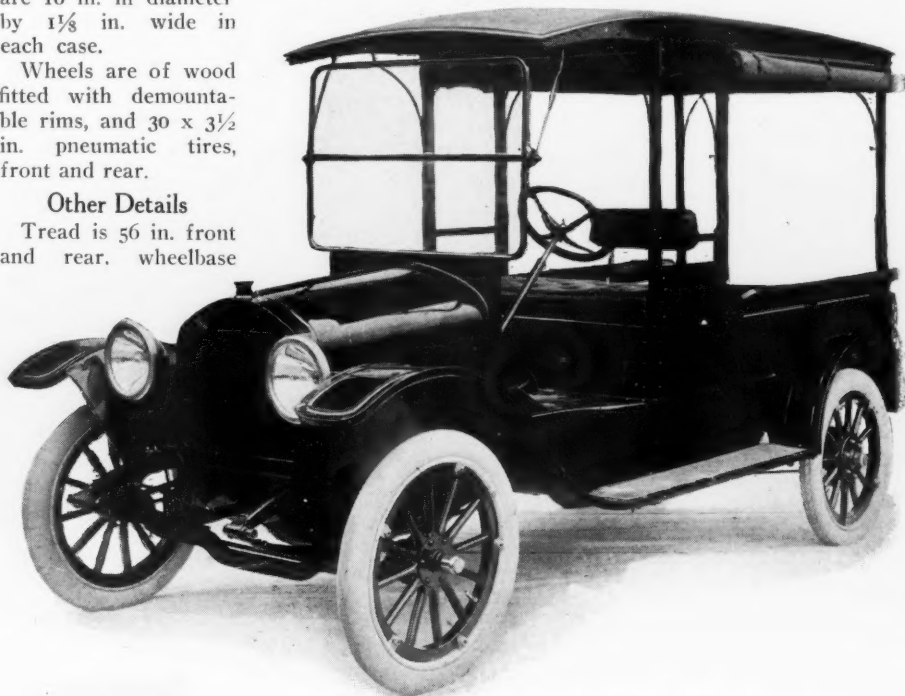
Two sets of brakes are provided, the hand or emergency set being of the internal type; the foot or service brakes being also of internal type. Both sets of brakes operate on the rear wheel drums, which are 10 in. in diameter by $1\frac{1}{8}$ in. wide in each case.

Wheels are of wood fitted with demountable rims, and $30 \times 3\frac{1}{2}$ in. pneumatic tires, front and rear.

Other Details

Tread is 56 in. front and rear. wheelbase

108 in., 6-volt starting and lighting system, pressed steel frame of flexible construction, left side drive, center control. Springs are Sheldon, wheels are Salisbury and steering gear is a Foster.



Ellsworth Standard Express, \$695

Has load capacity of 1000 lbs.; 108 in. wheelbase; 56 in. tread; pneumatic tires with demountable rims, $30 \times 3\frac{1}{2}$ in. all round, and thermo-siphon cooling



Rear View of Ellsworth Stake Body

Showing trussed rear axle, which is of Gemco make, Sheldon springs and general arrangement of chassis parts



Ellsworth Flareboard Express

Shown below: has electric starting, lighting and ignition; four-cylinder engine, $3\frac{1}{4} \times 5$ in.; selective sliding gearset; cone clutch and left-side steering



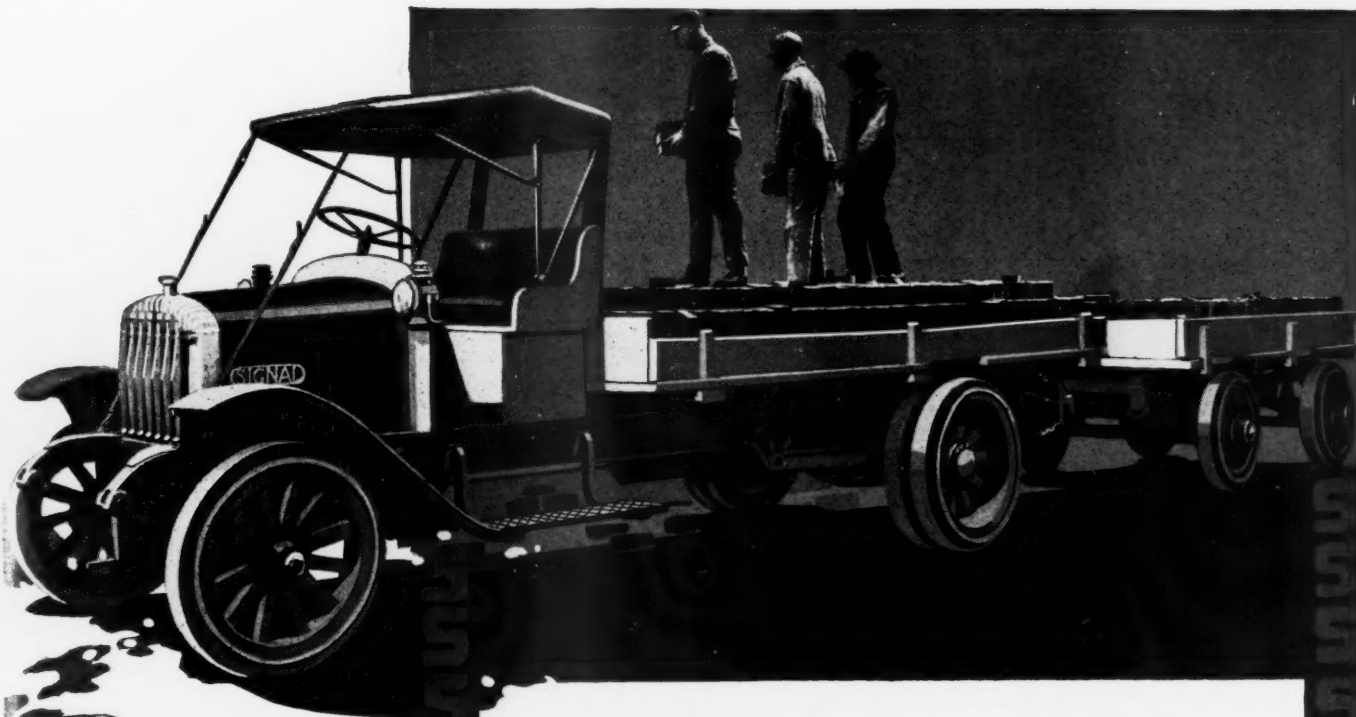
type, the latter of the selective sliding type giving three speeds forward and one reverse. Clutch and transmission are combined with the engine to form a unit power plant. The gear ratio on high is 4.46:1.

Axles, Brakes and Wheels

The rear axle is of full-floating type, Gemco make, the propulsion being taken through the springs. Driving torque is taken through the torsion tube. The front axle is also of Gemco make.

Front springs are semi-elliptic, rear cantilever.





Dealers:

The Signal idea is to put the service in the truck. If this idea appeals our proposition will interest you.

Worm Drive
1½ to 5 Tons

"On the Job"—Always

A Motor Truck is like a man. You invest in it for what it *does* rather than for what it is.

And big business says there is no better man-quality than the ability to be always "on the job."

For precisely the same reason that a man is profitable for what he *does* rather than for what he *is* a motor truck pays a profit only when it is persistently and consistently "on the job."

It is because we deem the ability to be "always on the job," the most important asset a truck *can* have that we emphasize it in Signal *construction* even more strongly than in Signal advertising.

It would be extremely foolish to put it in the advertising and leave it out of the construction. That is why Signal employs such units as Continental Motor, Timken-David Brown Axles, Brown-Lipe Transmissions, and Detroit Self-Lubricating Springs.

If the Signal idea appeals to you as a truck buyer or dealer get in touch with us at once.

SIGNAL

Motor Truck Company
Detroit, Michigan

When Writing, Please Say—"Saw Your Ad. in the CCJ"

Trucks Make Good in Newspaper Service

Rapid Delivery of the Big Metropolitan Dailies by Motor Truck Demonstrates the Fallacy of the Obsolete Horse-Drawn Vehicle

C. P. SHATTUCK

IT IS doubtful if a truck or commercial car can be subjected to a more severe usage than it receives in the work of delivering the daily newspapers in a metropolitan city. Motor ambulances, police patrols and fire apparatus are subjected to hard service, but the number of runs daily are small, as is the daily average miles traveled. These types mentioned have the right of way through the streets, are not wholly restricted by the traffic or speed laws, and, consequently, their progress is not impeded.

Conditions are exactly the opposite in the delivery of newspapers in New York City, for the companies and publications delivering by motor vehicles must conform to the traffic rules and speed laws the same as any private vehicle. This is a distinct handicap in the work, and radically different as to the conditions which formerly existed. At one time the newspaper vehicles were accorded the same privileges as the municipal apparatus. In other words, the speed limit was often that of the vehicle, governed, of course, by traffic conditions and the ability of the driver.

The general public does not realize the keen competition that exists between the publishers of the daily metropolitan newspapers. There are editions practically every hour or so during the day, and it is a keen race between the dailies to get the papers to the thousands of news stands. In the event of an extra edition or the chronicling of some news of importance—and the editors of the New York papers take advantage of ever live news item—the paper that gets its edition to the leading news stands ahead of the others not only realizes a big sale but derives much satisfaction in beating its rivals.

Speed is a vital factor in the delivery, and is necessary not only because of the desire to be the first to make a delivery but because of the territory to be covered. The daily and Sunday papers are printed down town, and the majority are located at what is known as newspaper row in the vicinity of City Hall.

In the case of one well-known daily the delivery of bundles of papers is made by motor vehicle by the Interborough Transfer Co., 406 West 45th street. The territory covered includes Broadway from as far south as Dey street to 149th street, a distance of approximately 10 miles. In covering this route the truck makes on an average 80 stops. Because of the ruling of the city fathers that motor vehicles delivering papers shall be subjected to the same restrictions as the private car—time is saved at the expense of the truck. In other words, the car is driven at top speed to within a few feet of the news stand, the brakes jammed on, and the bundle of papers tossed out. So expert have the driv-

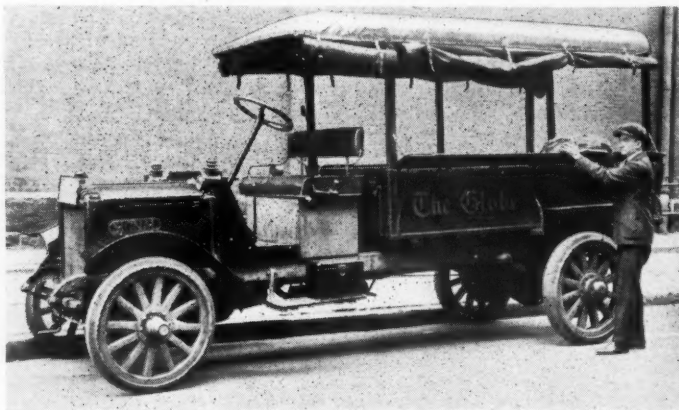
ers become, that they can gauge to a nicety the number of feet required to bring the car to a stop and in front of the stand. The start is made as quickly as the mechanism will permit, usually in the second speed and with the throttle wide open. There is no regard for tires or the mechanism of the car, for it is a case of time—not mechanism or money.

Not only is the truck subjected to this usage, or rather abuse, but on the return trips the drivers have a habit of taking to the side streets and avenues, where the traffic is lighter and where it is said the police are not as vigilant. These streets are, as a rule, in bad condition, many of them being badly paved with cobblestones. By this method the drivers can make much better time than by traversing the usual thoroughfares, as time is a factor in the return trip.

It is interesting to note that the truck, a Signal 1-ton, has been in this service

the salesman is satisfied his truck will stand up and will guarantee it, he makes a sale. The Signal people approached us and were told of the conditions. The truck was placed in service and demonstrated for five days, and was driven by five of our regular drivers. It subsequently proved satisfactory and was added to the fleet.

The territory covered by the truck would require relays of the one-horse vehicle. In times past the bundles of papers were sent by the L and Subway trains to certain stations, where they were delivered to the horse-drawn vehicles, which distributed the bundles over a certain territory which was limited in area. This required a large number of horses, which were handicapped by weather conditions, such as the heat in summer and icy street in winter. The use of the one-horse vehicle on the route mentioned has been abandoned for some time.



Signal Truck in Severe Service

This machine is used to deliver newspapers; is in use from eighteen to twenty-two hours a day and two shifts of drivers are employed.

for six months, and despite the fact that it is abused, it has given excellent service. To date the repair bills have been but \$39.01, which are small when it is considered that the car averages 135 miles daily. It is frequently in service from 18 to 22 hours of the 24, and two shifts of drivers are utilized.

The Signal truck is one of a large fleet maintained by the company, but it is of the smallest capacity employed. In purchasing trucks the company adopts an unusual method, for it is well aware the conditions the vehicle must meet. A salesman in approaching the concern is told frankly of the service required of a truck, and the suggestion is made that before he attempts to close a sale that he try a day's work. The demonstration is not made by one of the concern's drivers, but by a driver supplied by the truck company, but with the understanding that the schedule must be maintained. This is done because the usual guaranty would not cover the service. If

The keen competition existing among the metropolitan dailies does not permit of the use of the slower moving horse, for time is money in the publishing business. Horses are used to some extent in the delivery of papers, but only for very short hauls and in the proximity of the presses. From the time the press turns out the paper until it reaches the dealer it is one big rush, with speed the dominating factor.

ALLIANCE RUBBER Co. has been taken over by the Alliance Tire & Rubber Co., Inc., Alliance, O. Capital \$2,500,000. The executive officers and directors are: Milton Bejach, president and general manager; John C. Shively, vice president; Walter H. Christensen, secretary and superintendent; John B. Pow, treasurer. These officers, with Frederick W. Throssell, constitute the directorate.

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Truck Driver Real Factor in Successful Installation

Efficiency of Truck Counts for Twenty-five Per Cent, Driver's Efficiency Counts for the Balance

By C. W. SHAFER

WITH twenty delivery trucks in operation, M. Piowaty & Son, wholesale produce and fruit dealers in Grand Rapids and western Michigan, have recorded figures which clearly establish the value of the truck in their organization. This firm uses trucks exclusively, even for short hauling from freight sheds to warehouses, and in all instances the vehicles have proven their worth. Using his records as a basis for computation Fred M. Piowaty declares that one truck and one driver will more than do the work of two horse drawn vehicles and two drivers, and that two trucks, with two men each, will do the work of five teams, handled by five men. The increase in working scope is due almost entirely to the rapidity with which the operation is carried on.

The question of truck worth is not the popular question, according to Mr. Piowaty. That has been established beyond all doubt and it is plainly up to the business man of the present day to adopt the truck medium for delivery and transportation if he expects to keep pace with his competitors. The real question, however, is the question of securing the highest degree of efficiency from truck drivers. The efficiency of the truck counts for only 25 per cent.; the efficiency of the driver counts for the balance.

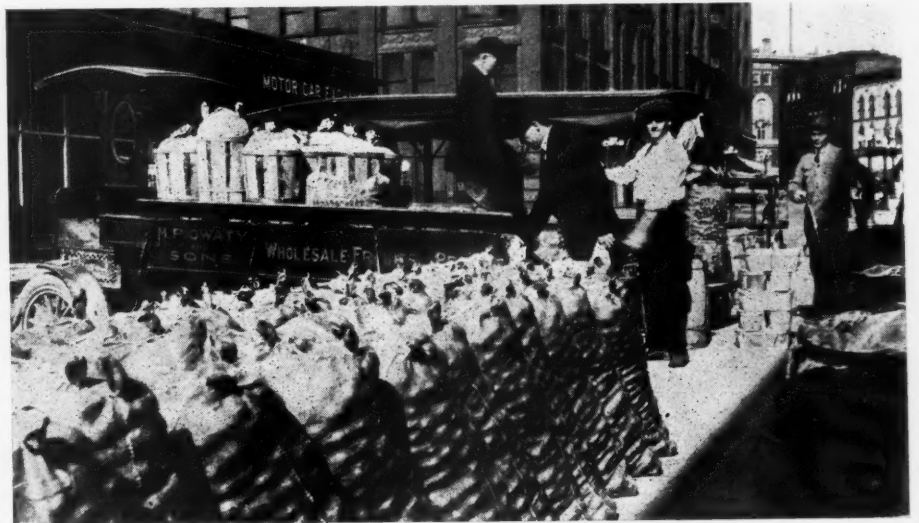
Sets Standard for Each Car

In this connection Mr. Piowaty has tried many systems and is at present at work on one which he believes will ultimately guarantee success in the issue. Using figures for several years on all repairs, overhauling, upkeep and every detail of maintenance, he will compute a standard amount for the maintenance of each car. This will be computed on a monthly basis and when it is established for each truck it will be posted. The driver will be notified of this standard and acquainted with the fact that, if he succeeds in lowering it during any month, his reward will be the difference between his mark and the standard. If he exceeds the standard he will not be forced to make up the excess but at the same time the mark will go against his record. The only detail that will not be figured in this system will be the tire repair and cost. In this connection too much depends upon chance and it could not be fairly used in making the computation. With all the other features, however, the driver, if he is careful and is anxious to make a record, is capable of making considerable headway. At the same time he is furthering the interests of his employer not only in the matter of saving expenses but in enhancing rapid and accurate deliveries.

For instance, a driver starts with a load from the wholesale headquarters for a remote part of the city. If he has no particular incentive to drive carefully he will speed up, take all manner of chances, and do a great deal of harm. Half way to his destination he may meet a friend and take him for a drive around a few blocks. Or, if the day is pleasant, he may decide on a little joy ride of his own. The result is that he uses more gasoline and oil and, at the same time, through his excessive speed, deteriorates his car. If, on the other hand, he is working up to a standard, he will pursue a careful course and will take the shortest route possible in order to effect a saving in materials and make his return trip in record time. He realizes that, at the end of the month, if he is reasonable

different makes. With this standardization the trucks are interchangeable for the drivers. One driver is able to use any other firm car as well as his own. Besides, the extra man whom all firms employ is capable of stepping in and running any car. Consequently, if a driver lays off or is taken sick, the extra has no trouble in filling his shoes, as he would have if the cars were of different makes.

Mr. Piowaty is the real force behind the movements of a half-million dollar business and his ideas are all induced by actual experience and figures. His system for obtaining the highest degree of efficiency will unquestionably work out to his profit as will his idea of the standardization of equipment. He declares that every owner of trucks, if he will apply the plans as he



A Typical Scene in Front of the Piowaty Establishment

This concern uses trucks exclusively in its business, even for short hauling from freight sheds to warehouse

and right, he will profit materially. This system of co-operation between Mr. Piowaty and his employees will unquestionably bring about a marked measure of success. It will not only decrease the cost of maintenance in the trucks but it will increase the efficiency of the delivery service. And more than that, the payment of the difference will establish a friendly relation which will prove an overpowering incentive for the driver to exert every effort to the profit of his employer.

Believes in Standardizing Fleet

Mr. Piowaty believes that the truck industry, in connection with commercial institutions, must be standardized. He believes that every firm should employ a certain type of truck, all of the same make, instead of purchasing different models of

has outlined, will discover more on the gratifying side of the books at the end of a year's work.

STUDEBAKER CORP. has let contracts for new buildings and additional equipment for the South Bend and Detroit factories, at a total expenditure of \$1,500,000. This is the second time within a year that the Studebaker concern has made substantial additions to the facilities, \$1,000,000 worth of buildings and equipment having been ordered on a previous occasion. The South Bend additions are a large modern foundry, 1100 x 150 ft., with 250 tons daily melting capacity, and a machine shop 900 x 300 ft., which will furnish double the facilities of the existing shops.

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It is a fact—curious perhaps—but a FACT, none the less, that the better the rubber compound used in a Solid Motor Truck Tire, the lighter that tire will be.

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When Writing, Please Say—"Saw Your Ad. in the CCJ"

How to Dress Up Your Show Window

By GEORGE W. GRUPP

HOW to make a motor truck show window attractive and pleasing so as to set the whole town talking about it is the big question.

In the first place it will never be accomplished if the window merely displays the different models. They should be so attractive that horse vehicle operators will be anxious to see what it is all about. The windows should be so attractive that people will begin to advertise it. Something besides a mere truck should be shown. The truck should be shown with auxiliary devices. Miniature models should be shown, so that the public can see how auxiliaries and demountable bodies increase the efficiency of the truck. These should be shown so as to demonstrate to the passerby that a truck can do more work with these appliances. Models should picture the truck as a space saver in stables, congested streets, etc. In other words, miniature models of all kinds should be shown so that the prospective buyer or horse vehicle user can see what a motor truck can and is doing. The truck itself should be loaded with groceries, for example. And near the truck and models, display cards should be placed on which the results and cost figures of grocers are tabulated. But in doing all this the dealer should centralize things so that all surrounding material forces the passerby to look at the truck itself. Each week he should change the display to a different business.

Then again he should be seasonable. Adapt the background to the prevailing season.

But he must not forget his lighting system as this is very important. If every dealer carried out some of the above ideas he would help very materially to popularize the truck. Of course it would be something new and out of the ordinary. That's what you want. And as a result it would attract a much larger audience and the people would get a better conception of the motor truck idea.

The New York Show-Window Situation

In New York City very few dealers have show windows. Why? Because rentals are prohibitive. It would only be a short time until they would find that their overhead costs are swallowing up all of their profits and more besides. Therefore only those who sell pleasure cars and motor trucks are in a position to have show windows. And because of this condition, most of the truck dealers fail to see wherein the show window has any value. This of course is a very debatable question. Most of the local dealers believe that all a dealer needs is an office in some building and a service station on some side street. Or if the office happens to be on the ground floor with a plate glass front they can then utilize the little space which they have with motor trucks parts in order to catch the eye of the passerby.

It was while the COMMERCIAL CAR JOURNAL representative was talking to H. Robert Fletcher, of the Lincoln Motor Co., Inc., agents of the Stewart truck, about utilizing small show windows that he dropped a very brilliant idea as to a possible solution of New York's show window problem. He said in part: "You readily appreciate that rentals make show windows prohibitive. There isn't any question in my mind that all of the dealers would like to have a show window in which to display their motor trucks. But when you are compelled to pay \$11,000 a year for a medium-sized show room on Broadway, the logical place, then it becomes an impossibility or a hopeless desire."

"There is only one way to solve this proposition and to do it would require a fat bank roll, plenty of push and real initiative, and the co-operation of every dealer in the city."

A Motor Truck Market Building

"Now the idea which I have in mind," he continued, "is this. Why not have a motor truck market. By that I mean a big building in which all the dealers will have their show windows and rooms, etc., just as you see stands in some of our food stuff markets. But I don't mean to have a big one-story building. I mean a building which would be a good many stories high. Then the prospective buyer could take the elevator to the top floor and walk down the hall and observe the various makes behind their plate glass fronts. If nothing suited him on the top floor, he could then walk down to the next floor and the next floor until he saw what he wanted. Besides in a building such as I have in mind, the dealer would be able to display his truck in a fashion which would be attractive. Also, it would be less expensive to have such a show window. Each prospect could then see all of the makes before he bought. As it is today, he only sees the truck of the salesman who is first on the job. And yet the truck which he might have liked very much better he never got a chance to see. This market idea would be helpful to the trade. It would place the motor truck on the level with the vital things of life."

How Some Display Their Trucks

He concluded his remarks by saying: "The way we display our trucks is by driving them up and down the streets or to the prospective customer's door. And in order to create a little excitement once in a while some dealer will have his truck painted red, white and blue and then hire a uniformed driver to drive up and down the principal streets for a few days in order to advertise the truck."

Paints Truck in Brilliant Colors

To attract attention and to get prospects the Standard Truck Corporation of New York, 518 West 37th Street, are having a truck painted in brilliant colors. They are having the color scheme reversed. That is,

instead of having the gear in light colors they are having it painted in darker colors and the body is being painted in very light colors. On the frame the name of the truck and agency will be painted.

Metal Sign to Attract Public

Mr. Campbell, the agent for the Indiana motor truck, commented on the display of trucks in this fashion: "When a man wants a truck he does not walk up Broadway to see which one he wants. And the only way you get him is by going directly to his place of business with the truck, and then he cannot make any excuse for not seeing your truck. But as far as the public is concerned the only thing we do is to attach a large metal sign to our truck which tells the name of the make and the name and address of our agency."

Special Scenery for Show Window

Charles H. Frank, manager of the Ford Delivery Car Co., is about to introduce a new idea in show window displaying. "In the near future I expect to have a scene painted of one of the principal streets on heavy card board which will be the exact width of my window. Then I will have several trucks, which I made, painted on large pieces of cut card boards, which I will stick up in front of the street scene. The names of the owners will be painted on the truck so that the people may know the real names of people whom I have supplied with trucks. And then in addition to this I expect to have some special lights in order that the paintings might be properly displayed at night."

Drive Chassis Through Streets

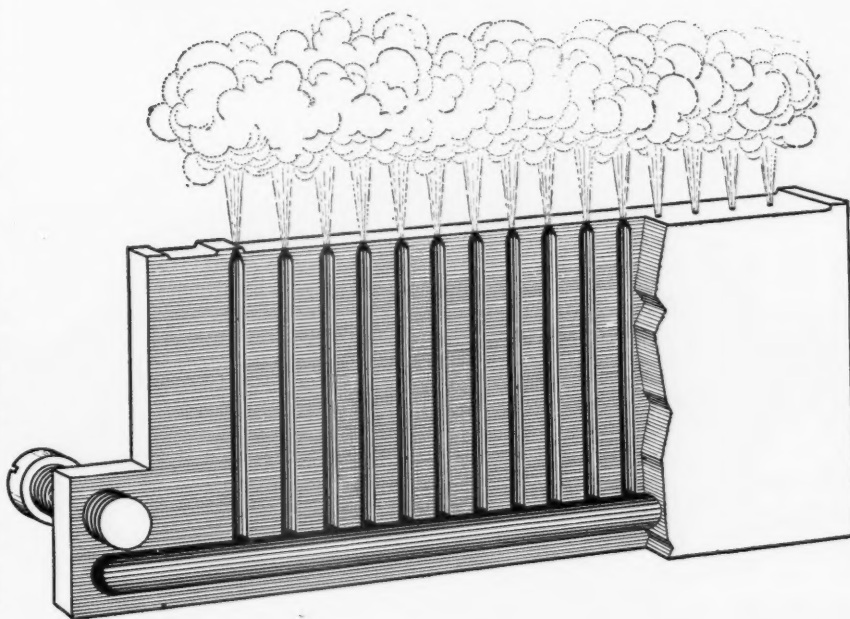
"There is only one method which we use in displaying our trucks," began R. S. Locke, secretary and sales manager of the Morton W. Smith Co., Inc., agents for the Federal trucks. "We simply drive through the streets with a mere chassis. Besides the driver a salesman goes along. They stop at some corner and then leave the engine running. A crowd soon gathers around the truck. These onlookers ask questions and sometimes they give the salesman a lead to a prospective buyer and sometimes the questioner is a prospect himself. On the truck we have the name of our agency."

Here are a few suggestions which might be helpful to the present methods used in displaying motor trucks. First, instead of merely having a sign on the truck which tells the name of the make and the local dealer, why not add "John Jones, a retail grocer, of 18 Doe Street, New York City, operates a truck like this for \$.... a day?" Also, those who have show windows, or even a small one, should utilize and get real value from it by sticking pictures on their windows showing their trucks in action, or put up posters which tell the actual cost of operating their truck by well known local concerns.

14 Jets Instead of 3

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Kansas City, Mo.,
Aug. 27, 1916.

Master Carbureter Corporation,
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Gentlemen:

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We have also equipped "Hale" motor fire apparatus for several other cities with the "Master" and have never had one word of complaint or objection.

Recently I equipped my private car with a "Master" and have obtained more power by its use and more mileage per gallon of gasoline as well.

With best wishes for your success, I am,

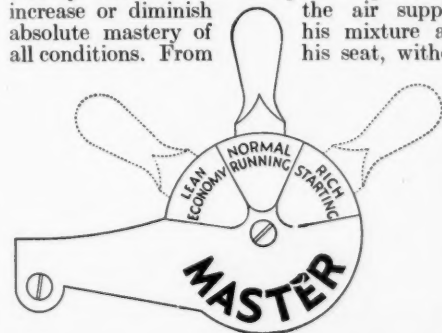
Very truly yours,

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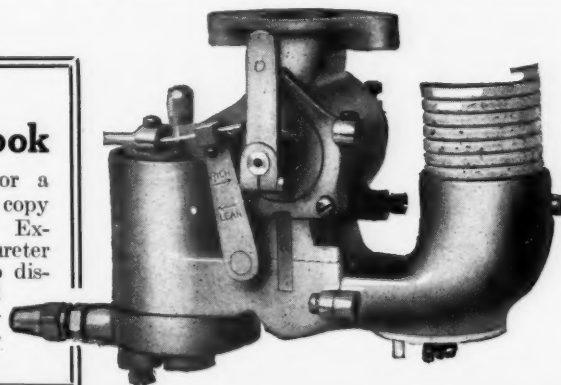
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When Writing, Please Say—"Saw Your Ad. in the CCJ"

Sewers Cleaned by Motor Power

By C. P. SHATTUCK

THE Bureau of Sewers, Borough of Manhattan, New York City, has placed in commission a novel 4-ton truck which is designed to replace the horse-drawn equipment, and, to a great extent, manual labor in cleaning catch basins. Every city maintains a fleet of horse-drawn vehicles for this work, and the expense of removing the dirt, etc., which flows with the water into the catch basins, thence to the sewers, amounts to a considerable sum during the fiscal year. This is particularly true in some sections of New York, especially where the carts conveying the material taken from the basins have to make long hauls to the dumping ground, which is at 130th Street and the North River. From this point to 180th Street and as far south as 110th Street, constitutes what is termed the long hauls, requiring considerable time with the horse-drawn equipment. In addition there are numerous grades to be climbed on the return from the dumping ground.

The present method of cleaning the catch basins comprises a one-horse vehicle and a gang of four men, including the foreman.

The territory above referred to requires four horse-drawn equipments of 1 cu. yd. capacity, and working under favorable conditions (short hauls) have a maximum capacity of 20 cu. yds. a day. When operating in the outlying districts of the territory the horses average about $3\frac{1}{2}$ miles in making the journey to the dump at the North River, and under favorable conditions make the trip in an hour. It requires about 20 minutes to empty the wagon, and the return trip requires about an hour and 25 minutes, as the return is all up-grade. In extremely warm weather and when the streets are covered with snow or ice, considerably more time is required.

The engineering department of the Bureau of Sewers, after a careful study of conditions and of apparatus utilized in other cities, appointed Grover Ebbel, M. E., of the engineering department, to prepare specifications which called for a 4-ton truck, a special $6\frac{1}{2}$ cu. yd. capacity metal dumping body, crane and power hoist. The Packard Motor Car Co. was the successful bidder on the truck, which is equipped with a Packard power take-off, which permits of utilizing the energy of the engine for work other than driving the vehicle. The body and crane were constructed by a local company, while the apparatus controlling the operation of the bucket is a standard equipment, utilizing oil under pressure.

The crane is located about midway of the chassis, and the chain to which the bucket is attached, winds around a drum operated by the power take-off, which is clearly shown in the accompanying illustration. The bucket, which opens and closes much in the same manner as a

dredging unit, is operated by the movement of a piston in a cylinder attached to the bucket. Two pipe lines supply the oil to the cylinder, and control is by a lever. The driver of the truck operates both the hoisting and bucket mechanism standing on a small platform on the right-hand side of the truck, where he can note easily the operation of the bucket.

Two men are utilized in addition to the driver-mechanic. One stands over the opening to the catch basin and guides the bucket into as well as out of the basin, while another man stands on a platform on the opposite side of the body, and by

several minor changes are to be made which will greatly improve the operation. On the long hauls, such as from 180th Street to the dump, the truck makes the trip in 25 minutes and the return slightly faster in spite of the grades. To dump requires about seven minutes. These figures, when compared with those of the horse-drawn equipment, show the greater efficiency afforded by the truck, particularly on long hauls.

No figures are obtainable as to the exact work performed by the motor equipment other than those presented. The



Cleaning City Catch Basins by Motor Power

Showing how Bureau of Sewers in Borough of Manhattan, New York City, is increasing the efficiency of its department by special apparatus which not only saves considerable time but greatly reduces department costs.

means of a rope swings the crane toward him when the bucket is raised above the top of the body. The bucket is lowered in an open position, and when it reaches the bottom of the basin the oil is turned on, closing the bucket. After hoisting, the bucket is opened by releasing the compression. Although the apparatus has been in service but a short time, the operator has become so proficient in its use that he can gauge to a nicety the distance required to lower and raise the bucket. John H. Harnou, who assisted the engineer in the preparation of the specifications, says that a novel feature of the apparatus is its control.

Although the truck has been in service but a short time it has demonstrated its possibilities as a time and labor saver. C. E. Gregory, chief engineer of the Bureau of Sewers, stated that the equipment is not working at its maximum efficiency, as

truck is handicapped by the fact that it is operated under the 8-hour labor law, whereas if in service 10 or more hours daily, or even operated with a double shift, it would effect a greater saving to the city. Assuming that the truck would average an hour to a load, working 24 hours, it would transport 132 cu. yds. (while the capacity of the truck is $6\frac{1}{2}$ cu. yds., but $5\frac{1}{2}$ are carried). To accomplish this work with horses, and estimating that one team would haul but 3 cu. yds. in 8 hours on the long trips, it would require three shifts of four teams to haul 36 cu. yds. in 24 hours. The maximum capacity of the equipment of four one-horse teams of 20 cu. yds. daily, as previously mentioned, includes long and short hauls, mostly the latter. These comparisons give some idea as to the possibilities of the motorized apparatus for cleaning catch basins in large cities.

Everybody who is anybody in the truck industry reads the CCJ